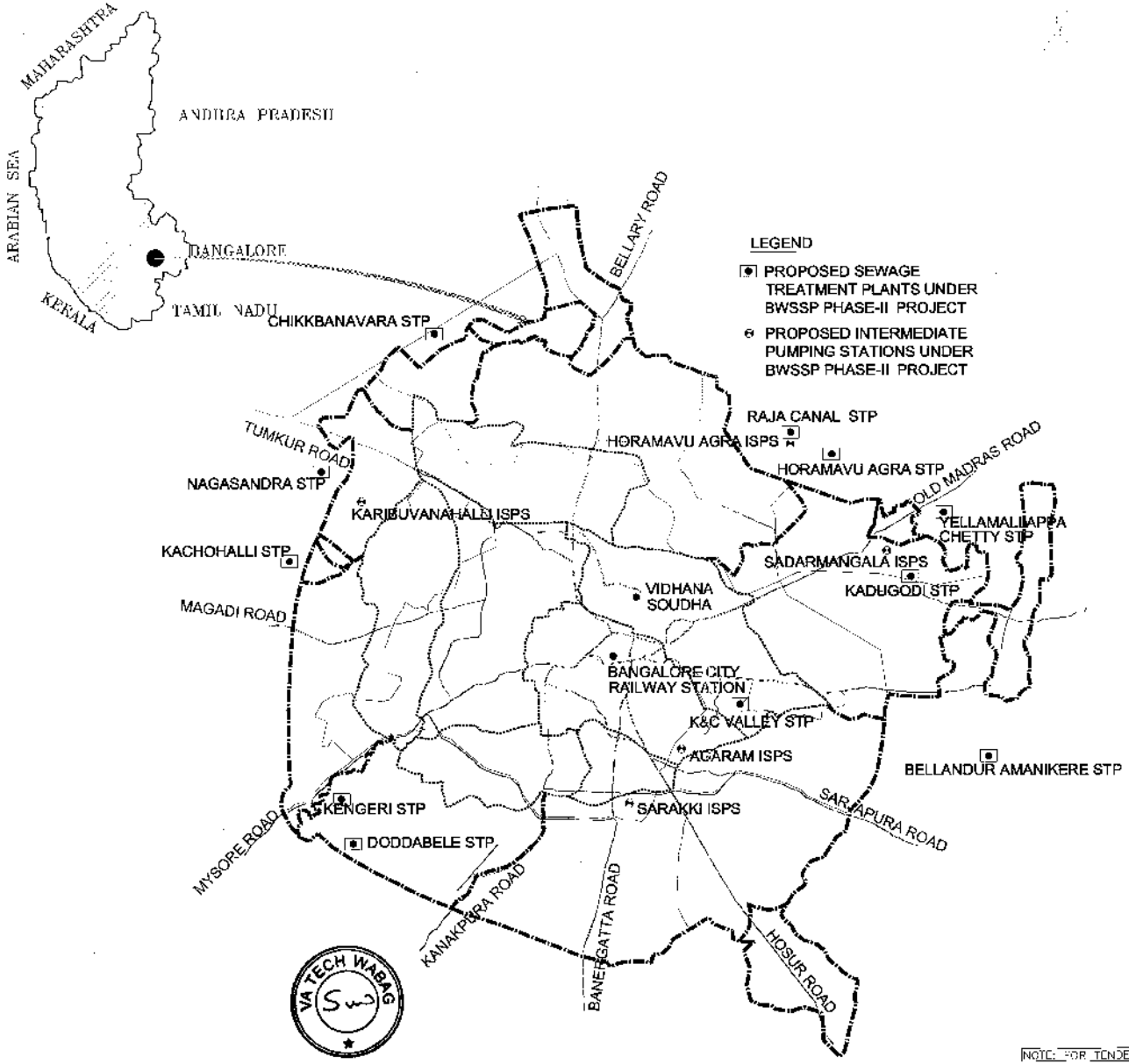


NOTE: FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

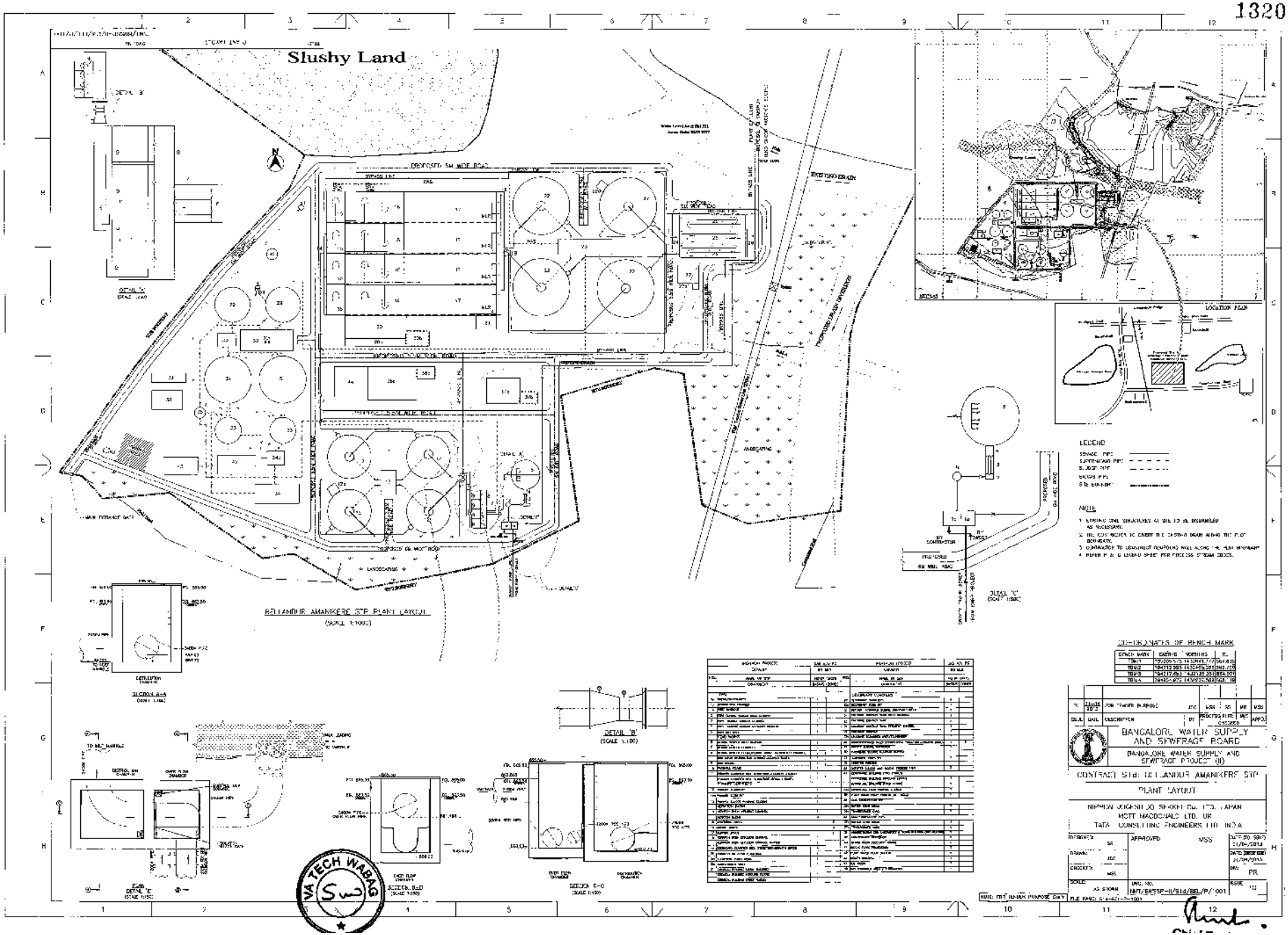
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (I)

CONTRACT STG: BELLANDUR AMANIKERE STP

BWSSP-II SEWAGE TREATMENT PLANT AND ISPS LOCATIONS

NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
EGIS CONSULTING ENGINEERS LTD. INDIA

Chief Engineer (K)
BWSSB



DESIGNATION OF BENCH MARK

BENCH MARK	EASTING	NORTHING	R.L.
TBM1	784209.515	1453943.777	894.436
TBM2	784312.995	1453445.205	862.158
TBM3	784317.653	1453135.351	854.571
TBM4	784350.872	1453037.583	863.768

NO.	DATE	DESCRIPTION	BY	CHECKED	APPD.
1	21.04.14	JOB NUMBER PLANNED	JCC	MSS	MR

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)

CONTRACT Std: BELLANDUR AMANIKERE STP

PLANT LAYOUT

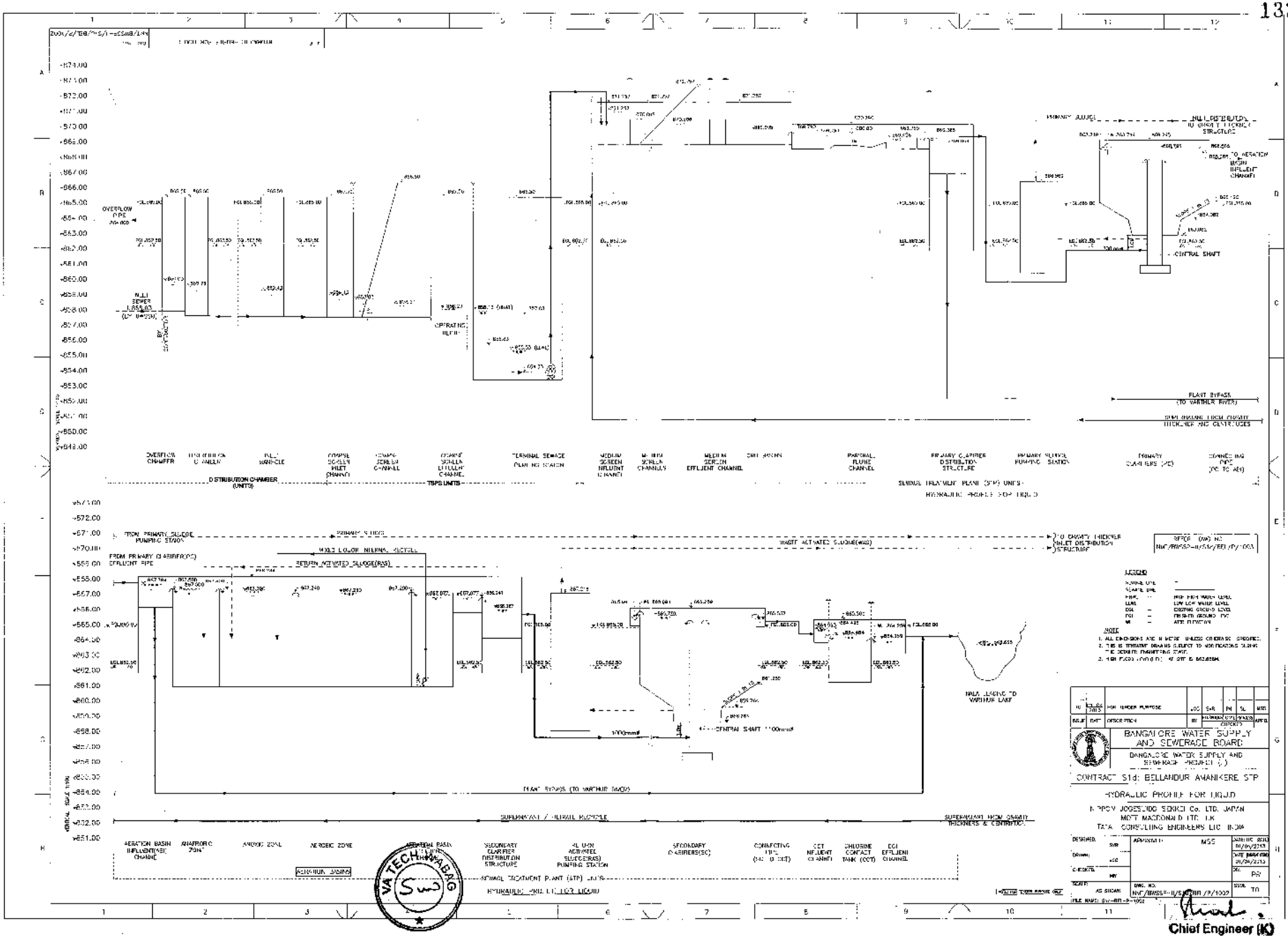
NIPPON JOGESUIDO SEKKEI Co. LTD., JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

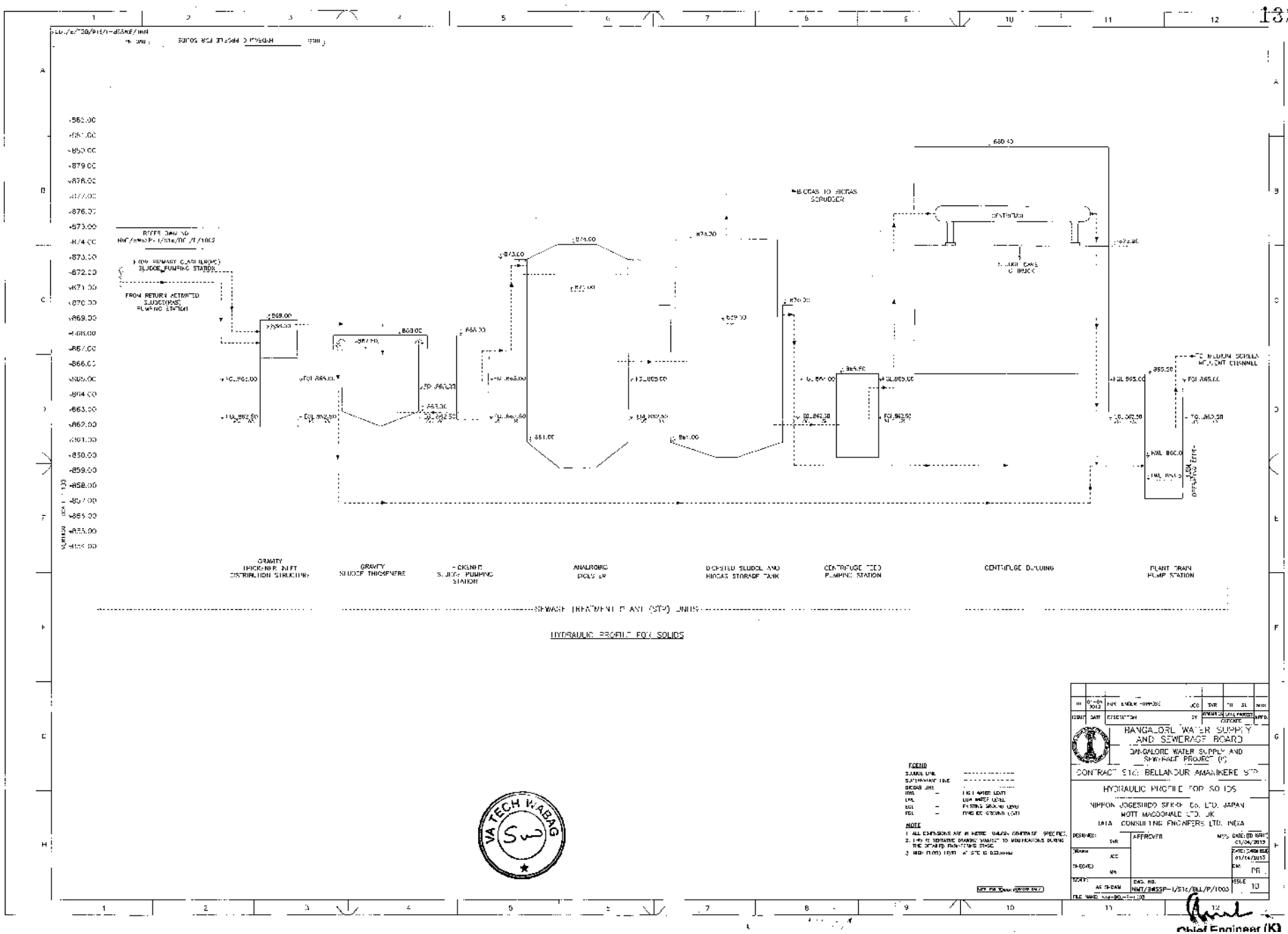
INITIATED	SS	APPROVED	MSS
DRAWN	JCC		
CHECKED	MSS		
SCALE	AS SHOWN	DWG. NO.	BWT/BWSSP-II/S14/BEL/P/001

DATE TO SENT 21/04/2014
DATE ISSUED 21/04/2014
BY: PR
ISSUE 1.1

NOTE: FOR IN-HOUSE PURPOSE ONLY

VA TECH WABAG


HYDRAULIC PROFILE FOR LIQUID
SEWAGE TREATMENT PLANT (STP) UNITS
DISTRIBUTION CHAMBER (UNITS)
TSPS UNITS
OVERFLOW CHAMBER
INLET DISTRIBUTION CHAMBER
INLET SEWER
COARSE SCREEN INLET CHANNEL
COARSE SCREEN CHANNEL
COARSE SCREEN EFFLUENT CHANNEL
TERMINAL SEWAGE PUMPING STATION
MEDIUM SCREEN INLET CHANNEL
MEDIUM SCREEN CHANNELS
MEDIUM SCREEN EFFLUENT CHANNEL
GRIT BASINS
PARSHAL FLUME CHANNEL
PRIMARY CLARIFIER DISTRIBUTION STRUCTURE
PRIMARY SLUDGE PUMPING STATION
PRIMARY CLARIFIERS (PC)
CONNECTING PIPE (TO AER)
PRIMARY SLUDGE
MULTI DISTRIBUTED TO EACH CLARIFIER STRUCTURE
TO AERATION BASIN INFLUENT CHANNEL
CENTRAL SHAFT
PLANT BYPASS (TO VARTHUR RIVER)
SUPERNATANT FROM SLUDGE THICKENER AND CENTRIFUGES
FROM PRIMARY SLUDGE PUMPING STATION
PRIMARY SLUDGE
TO GRAVITY THICKNER INLET DISTRIBUTION STRUCTURE
WASTE ACTIVATED SLUDGE(WAS)
MIXED LIQUOR INTERNAL RECYCLE
FROM PRIMARY CLARIFIER(PC) EFFLUENT PIPE
RETURN ACTIVATED SLUDGE(RAS)
CENTRAL SHAFT
NALA LEADING TO VARTHUR LAKE
PLANT BYPASS (TO VARTHUR RIVER)
SUPERNATANT / FILTRATE RECYCLE
SUPERNATANT FROM GRAVITY THICKNERS & CENTRIFUGE
AERATION BASIN INFLUENT(AB) CHANNEL
ANAEROBIC ZONE
ANOXIC ZONE
AEROBIC ZONE
AERATION BASINS
AERATION BASIN
SECONDARY CLARIFIER DISTRIBUTION STRUCTURE
RL (ON ACTIVATED SLUDGE(RAS) PUMPING STATION
SECONDARY CLARIFIERS(SC)
CONNECTING PIPE (TO CCT)
CCT INFLUENT CHANNEL
CHLORINE CONTACT TANK (CCT)
CCT EFFLUENT CHANNEL
SEWAGE TREATMENT PLANT (STP) UNITS
HYDRAULIC PROFILE FOR LIQUID
LEGEND
MWL MAX WATER LEVEL
LWL LOW LOW WATER LEVEL
EGL EXISTING GROUND LEVEL
FGL FINISHED GROUND LEVEL
WL WATER LEVEL
NOTE
1. ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE SPECIFIED.
2. THIS IS TYPICAL DRAWING SUBJECT TO MODIFICATIONS DURING DETAILED ENGINEERING STAGE.
3. HIGH FLOOD LEVEL IS AT RL 862.65M.
REFER (WS) NO. NWF/BWSSP-II/STP/BEL/P/1003
BANGALORE WATER SUPPLY AND SEWERAGE BOARD
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (-)
CONTRACT Std: BELLANDUR AMANIKERE STP
HYDRAULIC PROFILE FOR LIQUID
M/S PROV JOGESHIDO SEIKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. U.K
TATA CONSULTING ENGINEERS LTD INDIA
DESIGNED: SVR
DRAWN: KSC
CHECKED: MR
APPROVED: MSS
SCALE: AS SHOWN
DWG. NO. NWF/BWSSP-II/STP/BEL/P/1003
SHEET NO. 70
FOR TENDER PURPOSE
SVR
MSS
Chief Engineer (K)


GRAVITY THICKENER INLET DISTRIBUTION STRUCTURE
GRAVITY SLUDGE THICKENERS
ANAEROBIC DIGESTERS
DIGESTED SLUDGE AND BIOGAS STORAGE TANK
CENTRIFUGE FEED PUMPING STATION
CENTRIFUGE BUILDING
PLANT DRAIN PUMP STATION
SEWAGE TREATMENT PLANT (STP) UNITS
HYDRAULIC PROFILE FOR SOLIDS
BIOGAS TO BIOGAS SCRUBBER
CENTRIFUGE
SLUDGE CAKE TO TRUCK
FROM PRIMARY CLARIFIER(S) SLUDGE PUMPING STATION
FROM RETURN ACTIVATED SLUDGE(RAS) PUMPING STATION
TO MUNICIPAL SEWERS MONUMENT CHANNEL
OVERFLOW PIPE
FSL 865.00
FSL 862.50
SLUDGE 865.00
BGL 865.0
TBL 864.0
FCL 861.00
FCL 862.50
FCL 865.00
FSL 867.00
SD 867.00
SD 862.50
SD 865.00
SD 862.50
SD 865.50
SD 862.50
SD 865.50
SD 862.50
FSL 865.00
FSL 862.50
FSL 865.00
FSL 862.50
FSL 865.00
FSL

INSTRUMENT TYPE IDENTIFICATION LETTERS

THIS TABLE APPLIES ONLY TO THE FUNCTIONAL IDENTIFICATION OF INSTRUMENTS

FIRST LETTER			SUCCEEDING LETTERS		
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A ANALYSIS	ANALOG	ALARM		
B BURNER FLAME		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C CONDUCTIVITY (ELECTRICAL)			CONTROL	CLOSE
D DENSITY (MASS) OR SPECIFIC GRAVITY	DIFFERENTIAL OR DIGITAL			
E VOLTAGE (EMF)		PRIMARY ELEMENT		
F FLOW RATE	RATIO (FRACTION)			STOP/START
G GAGING (DIMENSIONAL)		GLASS		
H (HAND) MANUALLY INITIATED				HIGH
I CURRENT (ELECTRICAL)		INDICATE PV, INPUT		
J TIME OR POWER TIME SCHEDULE	SCAN		CONTROL STATION	
K				
L LEVEL		LIGHT (PILOT)		LOW
M MOISTURE OR HUMIDITY				MIDDLE, INTERMEDIATE
N USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O EVENT, STATE OR PRESENCE		ORIFICE (RESTRICTION)		OPEN
P PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q QUANTITY	INTEGRATE OR TOTALIZE			
R RADIOACTIVITY	RELIEF	RECORD OR PRINT		REVERSE
S SPEED OR FREQUENCY	SAFETY		SWITCH OR SELECTOR	
T TEMPERATURE			TRANSMIT	
U MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION VALVE, DAMPER OR LOUVER	MULTIFUNCTION
V VIBRATION				
W WEIGHT OR FORCE		WELL		
X UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y USER'S CHOICE			RELAY OR COMPUTE	
Z POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

SYMBOLS

- INSTRUMENT TO PROCESS SIGNAL SOFTWARE LINK
- CAPILLARY TUBE
- PNEUMATIC
- HYDRAULIC
- GUIDED SONIC
- NEEDLE VALVE (NRV)
- BALL VALVE (BV)
- BALL CHECK VALVE (BCV)
- SWING CHECK VALVE (SCV)
- GLOBE CHECK VALVE (GCV)
- BUTTERFLY VALVE, DAMPER (BFV)
- PLUG VALVE (PV)
- PROPORTIONING PLUG VALVE (PPV)
- GATE VALVE (GV)
- DIAPHRAGM VALVE (DPV)
- GLOBE VALVE (GLV)
- FLOAT VALVE (FV)
- 3-WAY MIX VALVE
- 3-WAY DIVERTER VALVE
- 3-WAY SOLENOID VALVE
- ANGLE VALVE
- SOLENOID VALVE (SV)
- SELF-OPERATING BACK PRESSURE REGULATOR VALVE (PBR)
- SELF OPERATING PRESSURE REGULATOR VALVE (PRD)
- PRESSURE REDUCING REGULATOR VALVE (WEXTERNAL PRESSURE TAP (PRDW)
- PINCH VALVE
- SLIDE GATE (SLGAT)
- MOTORIZED SLIDE GATE
- SLUICE GATE (SLUGAT)
- AIR RELEASE VALVE (ARV)
- BALL VALVE
- 3 WAY BALL VALVE
- DRUM SCREEN
- DRUM SCREEN MICROMI (MS)
- DRUM SCREEN FINE (FS)
- ACCUMULATOR
- AERATOR
- CALIBRATION STANDPIPE
- CHEMICAL SEAL (CSL)
- INLINE SEAL (ILS)
- CONCENTRIC REDUCER
- DRAIN (DRN)
- DUPLEX STRAINER
- ECCENTRIC REDUCER
- FLEXIBLE HOSE
- GRINDER
- VERTICAL SHAFT MIXER (MXR)
- PRESSURE GAUGE
- KNIFE GATE VALVE
- RADIO, ULTRASONIC OR ACOUSTIC SIGNAL
- RUPTURE DISC (PRESSURE RELIEF)
- SCRAPER
- STRAINER
- FLEXIBLE CONNECTOR
- SILENCER
- DISCHARGE SILENCER
- DIFFUSER OR GUIDE VANES
- PRESSURE SENSOR
- STATIC MIXER
- TANK VENT
- UNION
- CYLINDER ACTUATOR
- DIAPHRAGM ACTUATOR WITH POSITIONER
- HAND OPERATOR
- HAND OPERATOR
- HAND OPERATOR
- HYDRAULIC OPERATOR
- EXPANSION JOINT
- VACUUM RELIEF VALVE (VRV)
- QUICK DISCONNECT
- MOTOR OPERATOR
- PNEUMATIC OPERATOR
- SOLENOID OPERATOR
- TERMINAL STRIP IN LOCAL PANEL FOR INTERFACE WITH COMPUTER/PLC
- FLOW ELEMENT GENERAL (FE) (DEFINED IN SPECIFICATIONS)
- VORTEX METER (FM)
- MAGNETIC FLOWMETER (FM)
- PARSHALL FLUME (FM)
- DOSING PUMP
- ROTAMETER (FM)
- ACOUSTIC OR DOPPLER IN LINE FLOWMETER
- AXIAL FLOW PUMP
- BLOWER (BWR)
- CENTRIFUGAL PUMP (PMP)
- SUBMERSIBLE CENTRIFUGAL PUMP (PMP)
- SCREW PUMP
- PRESSURE RELIEF VALVE (PRV)
- PULSATION DAMPENER (PD)
- WEIR
- DIAPHRAGM PUMP (PMP)
- HOSE PUMP (PMP)
- METERING PUMP (PMP)
- POSITIVE DISPLACEMENT BLOWER (BWR)
- PROGRESSIVE CAVITY PUMP (PMP)
- ROTARY LOBE PUMP (PMP)
- SUBMERSIBLE MIXER (MXR)
- INLET/DIFFUSER (PIT / SUM)
- DIFFUSER
- HORN (HRN)
- SURGE VESSEL (SGV)
- AIR FLOW METER
- FLOW METER
- SCUM COLLECTOR

MISCELLANEOUS ABBREVIATIONS

- I/P CURRENT TO PNEUMATIC CONVERTER
- E/I VOLTAGE TO CURRENT CONVERTER
- ADD OR TOTALIZE
- SQUARE ROOT
- X MULTIPLY
- ÷ DIVIDE
- HIGH SELECT
- MV MEASURED VARIABLE
- LOW SELECT
- S.P. SET POINT
- PLC PROGRAMMABLE LOGIC CONTROLLER
- f(x) CHARACTERISTIC
- P PROPORTIONAL (CONTROL MODE)
- D DERIVATIVE
- FC FULLY CLOSE
- FO FULLY OPEN
- HH HIGH - HIGH
- LL LOW - LOW
- H HIGH
- L LOW
- ∫ INTEGRAL CONTROL MODE
- Δ DIFFERENCE
- I/O INPUT / OUTPUT
- ER ELECTRICAL ROOM
- LEL LOWER EXPLOSIVE LIMIT
- DW DICHLORINE
- OC ODOR CONTROL
- OCF ODOR CONTROL FAN
- WW WASTE WATER
- D DRAIN
- OTC OPEN-TRAVEL CLOSE
- VFD VARIABLE FREQUENCY DRIVE
- FACP FIRE ALARM CONTROL PANEL
- ATS AUTOMATIC TRANSFER SWITCH
- VSD VARIABLE SPEED DRIVE
- BPS BOOSTER PUMP STATION
- AS AIR SUPPLY
- LCP LOCAL CONTROL PANEL
- OF OVERFLOW
- STPC STOP CONTROL
- SS SOFT SWITCH, SOFT STARTER

INSTRUMENT SYMBOLS

FUNCTIONAL IDENTIFICATION (SEE LEGEND TABLE)

- HS = MODIFIER
- 24 = LOOP NUMBER
- 001 = INSTRUMENT LOCATION
- SUPPLIER

- FRONT PANEL MOUNTED
- REAR PANEL MOUNTED
- FIELD MOUNTED
- STATUS INDICATION
- 120 VAC POWER SUPPLY
- INTERLOCK LOGIC
- MOTOR STARTER
- SPECIFIC LOOP NUMBER
- DUPLICATE LOOP IDENTIFICATION SYMBOL
- REFERENCE LOOP NUMBER
- COMPUTER CONTROL SYSTEM CONFIGURABLE FUNCTION (DISPLAYED ON HMI)
- COMPUTER CONTROL SYSTEM CONFIGURABLE FUNCTION (NOT DISPLAYED ON HMI)
- SOFTWARE LOGIC
- CONFIGURABLE FUNCTION (NOT DISPLAYED ON CRT)
- MOTORIZED VALVE INDICATION ON HMI
- PRESSURE INDICATING TRANSMITTER
- FLOW INDICATING TRANSMITTER
- LEVEL INDICATING TRANSMITTER
- ANALYZER INDICATING TRANSMITTER

- FACILITY PREFIX
- SPECIFIC LOOP NUMBER
- DUPLICATE LOOP IDENTIFICATION SYMBOL
- REFERENCE LOOP NUMBER
- REFERENCE FACILITY
- REFERENCE FACILITY IS THE SAME AS THE FACILITY PREFIX

SUPPLIERS

ALL INSTRUMENTS ARE SPECIFIED BY INSTRUMENTATION UNLESS INDICATED (S).

(E) SPECIFIED BY ELECTRICAL (X) EXISTING
(M) SPECIFIED BY MECHANICAL (P) SPECIFIED BY PLUMBING
(F) FURNISHED WITH EQUIPMENT

PLC INPUT/OUTPUT SYMBOLS

- ANALOG INPUT
- DISCRETE INPUT
- ANALOG OUTPUT
- DISCRETE OUTPUT

HAND SWITCH POSITION SYMBOLS

(UNLABELLED SWITCHES ARE TO BE ON-OFF)

- A AUTO
- C CLOSE
- H HAND
- J JOG
- L LOCAL
- M MANUAL
- O OPEN OR OFF
- R REMOTE
- S/S START / STOP
- E/S EMERGENCY STOP
- BTY BATTERY
- STBY STANDBY
- FOR FORWARD OFF - REVERSE (SPRING RETURN TO OFF)
- R/L LOCAL / REMOTE
- LOR LOCAL-OFF-REMOTE
- H/O/R HAND-OFF-REMOTE
- O/S/C OPEN - STOP - CLOSE
- M/O/A MANUAL - OFF - AUTO
- U/S/D UPWARD - STOP - DOWNWARD

PROCESS STREAM CODES

- ABWF = Aerobic Beds Influent
- AEF = Aerobic Effluent
- AL = Alum
- CL = Chlorine Gas
- CTA = Citric Acid
- DFLT = Dewatering Filtrate
- DSE = Digester Effluent
- DGI = Digester Influent
- DSUP = Sludge Tank Supernatant
- DWSL = Dewatered Sludge
- ETF = Equalization Effluent
- FOG = Fats, Oil, Grease
- G = Biogas
- GSA = Grit Sands Air
- GWS = Grit Slurry
- INF = Plant Influent
- MG = Methanol Gas
- ML = Mixed Liquor
- MLR = Mixed Liquor Internal Recycle
- PAA = Process Aeration Air
- PEF = Primary Effluent
- PER = MBR Permeate
- PLW = Plant Water
- PRD = Process Drain
- PREF = Preliminary Effluent
- PSL = Primary Sludge
- PSM = Primary Scum Mixture
- PSR = Primary Sludge Recirculation
- RAS = Return Activated Sludge
- RCY = Recycle
- SD = Storm Water Drain
- SEF = Secondary/ BBR Effluent
- SHC = Sodium Hypochlorite
- SSM = Secondary Scum Mixture
- SWR = Service Water
- TEF = Treated Effluent
- TFSL = Thickening Filtrate
- TSL = Thickened Sludge
- VTA = Ventilation Air
- WAS = Waste Activated Sludge

VATECH WABAG

NO	DATE	DESCRIPTION	BY	CHKD	APPD
0	01.09.2012	FOR TENDER PURPOSES	KS	MV	MS

ISSUE DATE: 01.09.2012

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)

CONTRACT S1(J) PELLANUR AMANIKERE S.P.

PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)
LEGEND, SYMBOLS, ABBREVIATIONS AND CODES

NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

DESIGNED: KS/MV/JD
DRAWN: KS/JD
CHECKED: MMS
SCALE: NTS
APPROVED: MSS
DATE: 30.09.2012
DWG. NO.: WMT/BWSSP(II)/S-1/SEL/I/101
REV: 0
SIZE (MM): 594 (W) x 1052 (H)

Chief Engineer (K)

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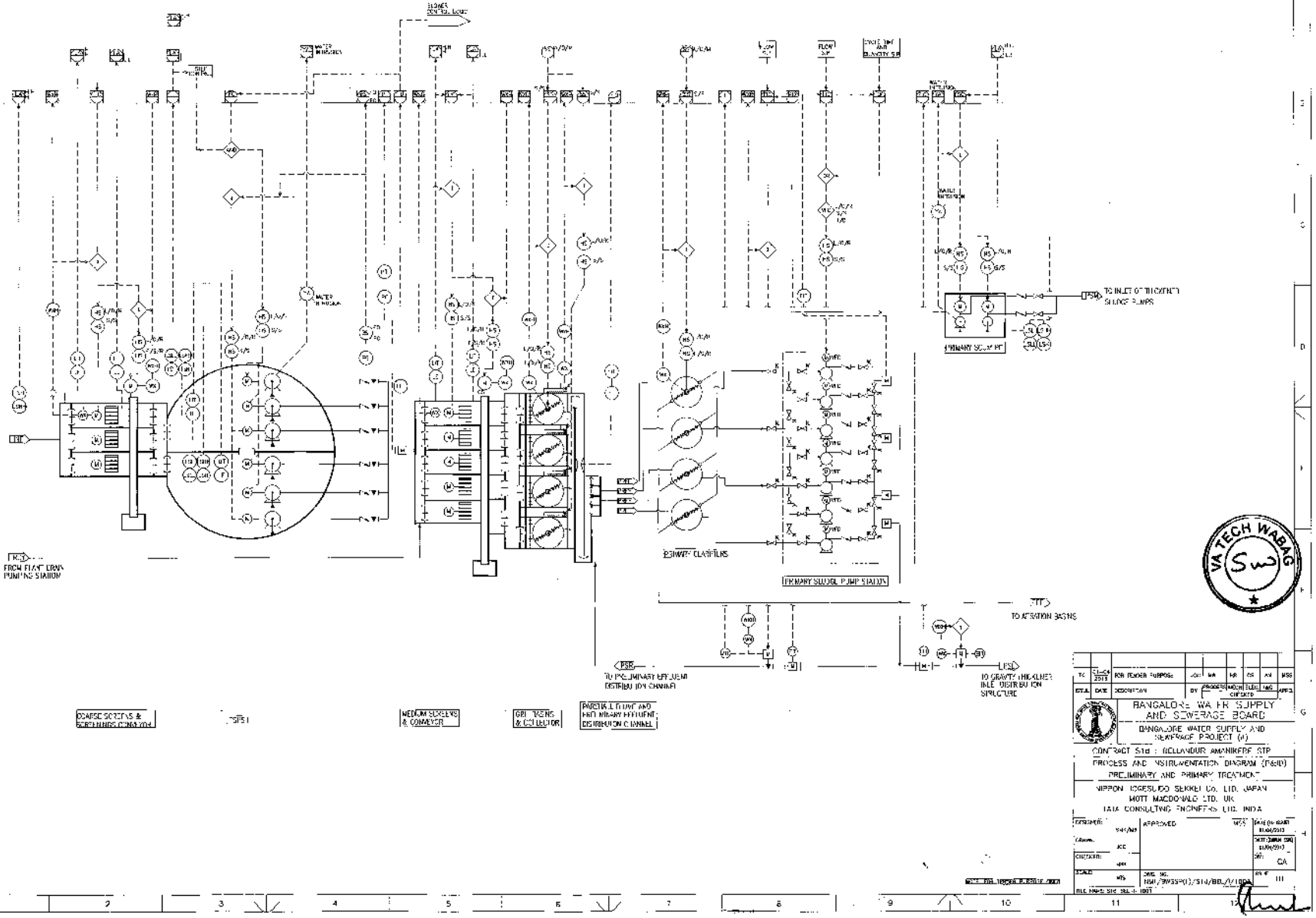
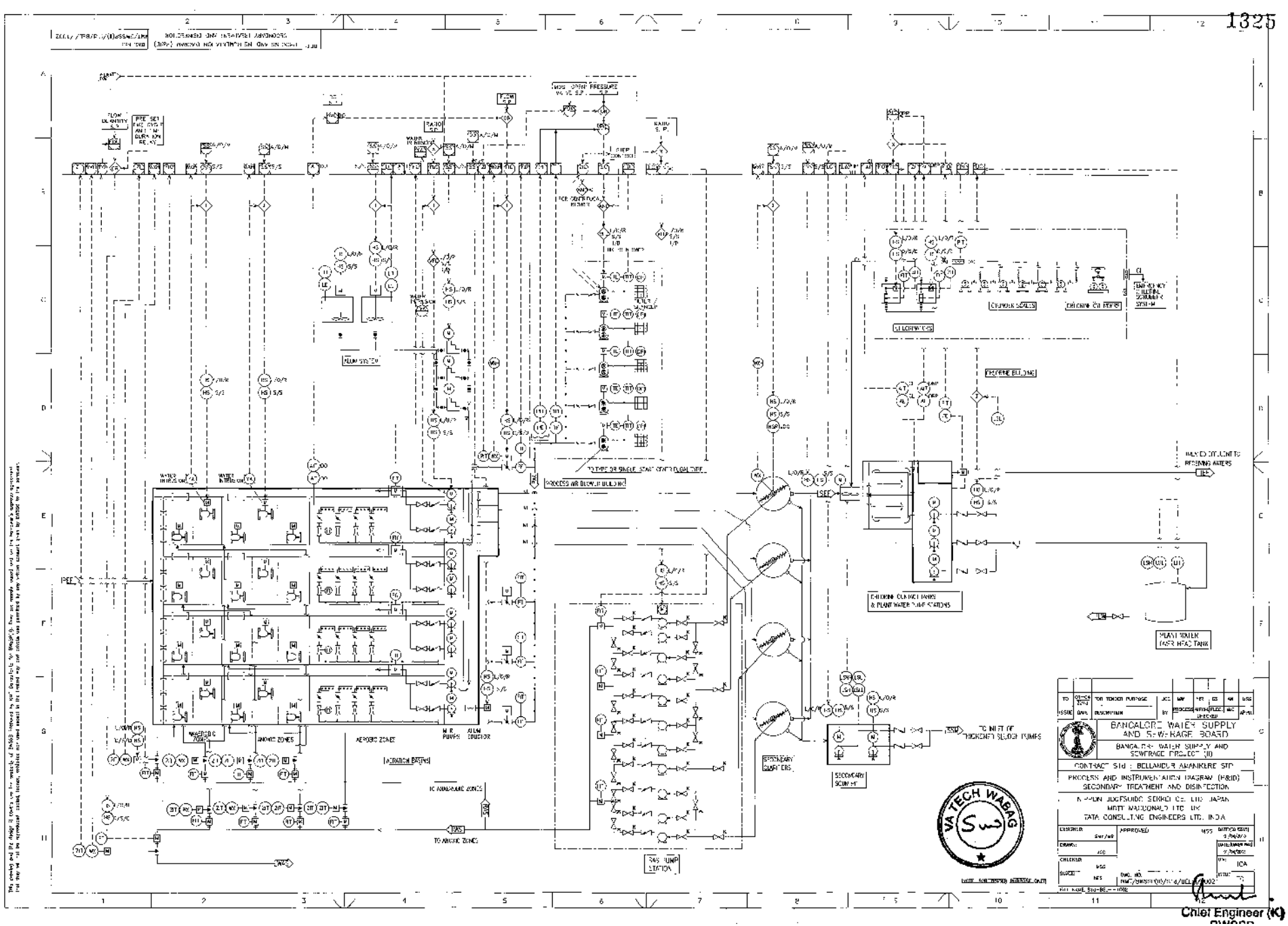
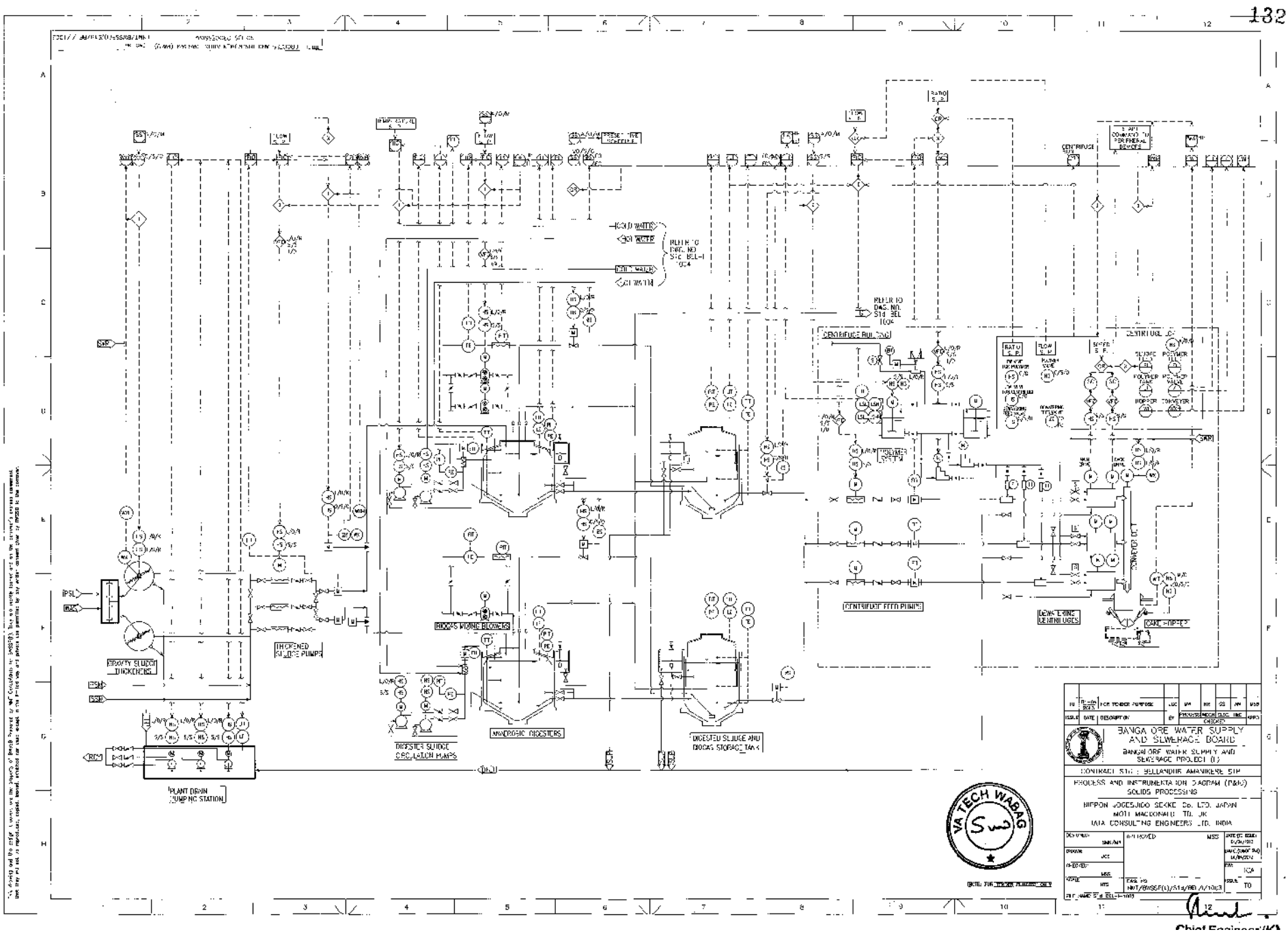
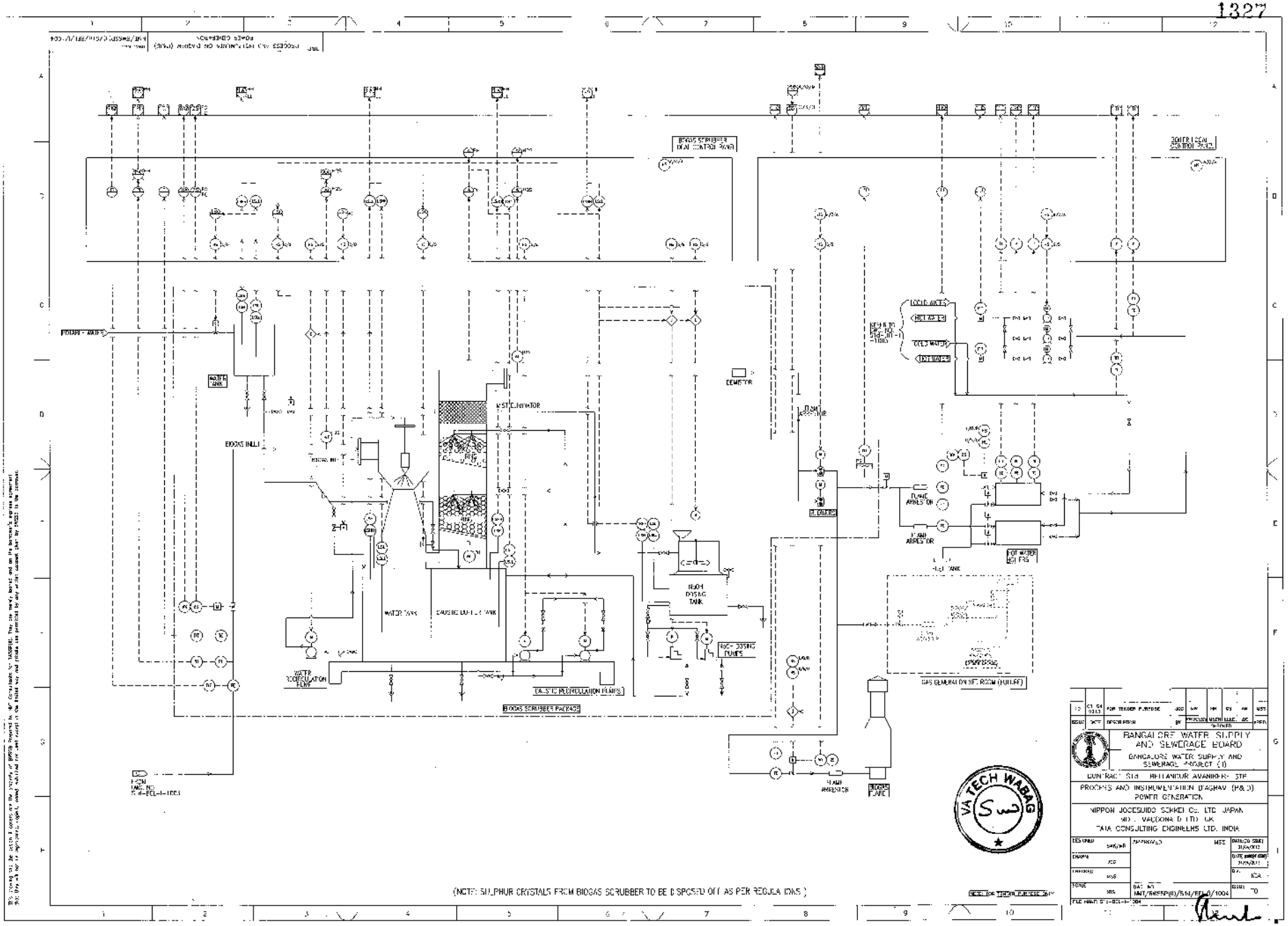

NOTE:
1. THE PLANT OPERATE IN COMPLETE AUTO MODE OF OPERATION VIA PLC BASED SCADA SYSTEM.
2. PUMPS SHALL OPERATE ON FLOW, LEVEL AND PRESSURE INTERLOCKS.
3. ALL MOTORS, VALVES, MIXERS ETC SHALL BE OPERATED IN AUTO MODE VIA PLC BASED SCADA SYSTEM.
FROM FLAT IRON PUMPING STATION
COARSE SCREENS & SCREENINGS CONVEYOR
MEDIUM SCREENS & CONVEYOR
GRIT TANKS & COLLECTOR
PARSHALL FLUME AND PRIMARY EFFLUENT DISTRIBUTION CHANNEL
PRIMARY CLARIFIERS
PRIMARY SLUDGE PUMP STATION
PRIMARY SCUM PIT
TO INLET OF THICKENER SLUDGE PUMPS
TO ATERATION BASINS
TO PRELIMINARY EFFLUENT DISTRIBUTION CHANNEL
TO GRAVITY THICKENER DISTRIBUTION STRUCTURE
VA TECH WABAG
BANGALORE WATER SUPPLY AND SEWERAGE BOARD
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)
CONTRACT S1a : BELLANDUR ANAMIKERE STP
PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)
PRELIMINARY AND PRIMARY TREATMENT
NIPPON KOEI LTD. & SEKKEI CO. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA
APPROVED
DWG NO. NM/BWSSP(II)/S1a/BBL/V/1004

Chief Engineer (K)


BANGALORE WATER SUPPLY AND SEWERAGE BOARD
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)
CONTRACT Std : BELLANDUR AWANKERE STP
PROCESS AND INSTRUMENTATION DIAGRAM (P&ID) SECONDARY TREATMENT AND DISINFECTION
NIPPON JOGESUIDO SEKKO Co. LTD. JAPAN
MOTT MACDONALD LTD UK
TATA CONSULTING ENGINEERS LTD. INDIA
AERATION BASINS
AEROBIC ZONES
ANOXIC ZONES
ANAEROBIC ZONES
SECONDARY CLARIFIERS
CHLORINE CONTACT TANKS & PLANT WATER PUMP STATIONS
PLANT WATER (SBR HEAD TANK)
TO INLET OF THICKENED SLUDGE PUMPS
RAS PUMP STATION
TO ANOXIC ZONES
PRESENT BUILDING
CHLORINATORS
VA TECH WABAG
Chief Engineer (K)


GRAVITY SLUDGE THICKENERS
THICKENED SLUDGE PUMPS
PLANT DRAIN PUMPING STATION
DIGESTED SLUDGE CIRCULATION PUMPS
ANAEROBIC DIGESTERS
BIOGAS MIXING BLOWERS
DIGESTED SLUDGE AND BIOGAS STORAGE TANKS
CENTRIFUGE FEED PUMPS
DEWATERING CENTRIFUGES
CAKE HOPPER
REFER TO DWG. NO. STP/BELL-I/004
CENTRIFUGE BUILDING
CENTRIFUGE
BANGA ORE WATER SUPPLY AND SEWERAGE BOARD
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (I)
CONTRACT STP : BELLANDUR AMANIKERE STP
PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)
SOLIDS PROCESSING
NIPPON JOGESUIDO SEKKE Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA
FOR TENDER PURPOSE
APPROVED
Chief Engineer(W)



12	01.04.2013	FOR TENDER PURPOSE	JCS	MK	HM	KS	AM	MSS
ISSUE	DATE	DESCRIPTION	BY	PROCESS	MECH.	ELEC.	I&C	APPD.

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (I)

CONTRACT SI-8 BELLANDUR (VARTHUR) STP

PROCESS AND INSTRUMENTATION DIAGRAM (P&ID) POWER GENERATION

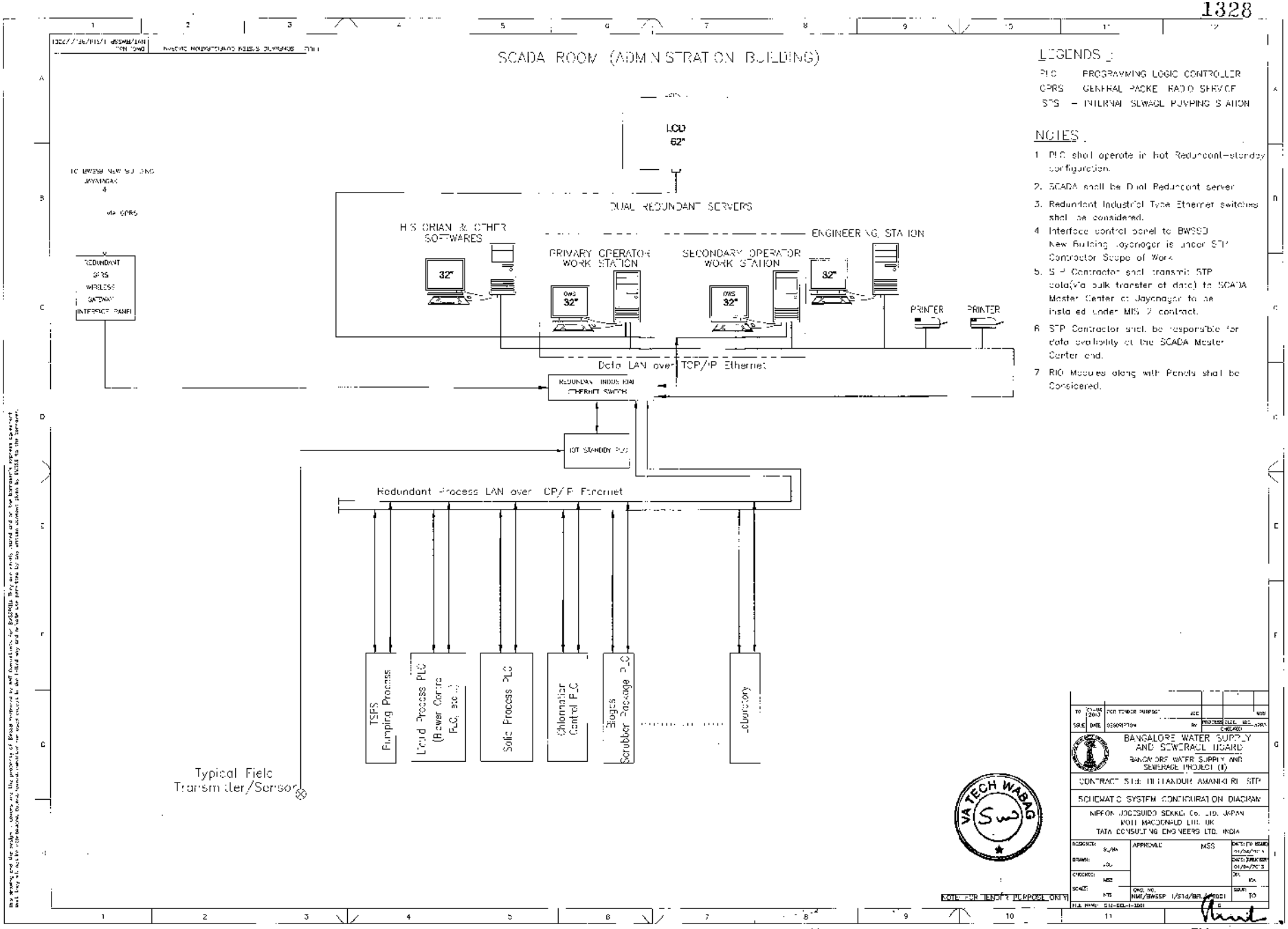
NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MD. VADODRA (I) LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

DESIGNED	SMS/MR	APPROVED	MSS
DRAWN	JCS		
CHECKED	MSS		
TRACED	MR		

DATE(AS BUILT) 31/05/2013
DATE APPROVED 31/05/2013
DWG. NO. BCA
DAC NO. BWT/BWSSP(II)/S14/PEL-I/1004
ISSUE 12
FILE NAME: S14-PEL-I-1004

VA TECH WABAG

Chief Engineer (K)



LEGENDS :

PLC — PROGRAMMING LOGIC CONTROLLER
GPRS — GENERAL PACKET RADIO SERVICE
STP — INTERNAL SEWAGE PUMPING STATION

NOTES :

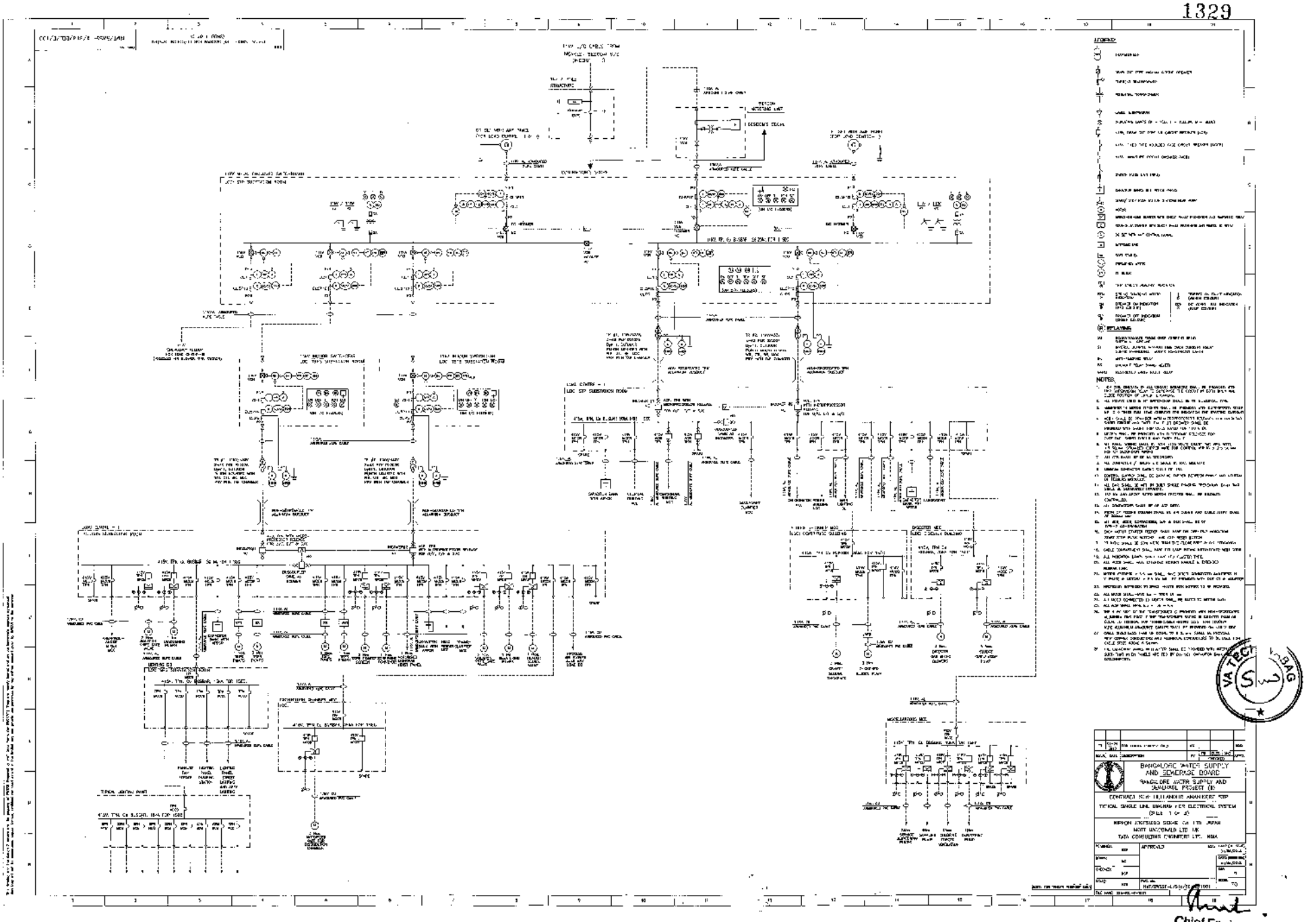
1. PLC shall operate in Hot Redundant-standby configuration.
2. SCADA shall be Dual Redundant server.
3. Redundant Industrial Type Ethernet switches shall be considered.
4. Interface control panel to BWSSB New Building Jayanagar is under STP Contractor Scope of Work.
5. STP Contractor shall transmit STP data(via bulk transfer of data) to SCADA Master Center at Jayanagar to be installed under MIS 2 contract.
6. STP Contractor shall be responsible for data availability at the SCADA Master Center end.
7. RIO Modules along with Panels shall be Considered.

NOTE: FOR TENDER PURPOSE ONLY

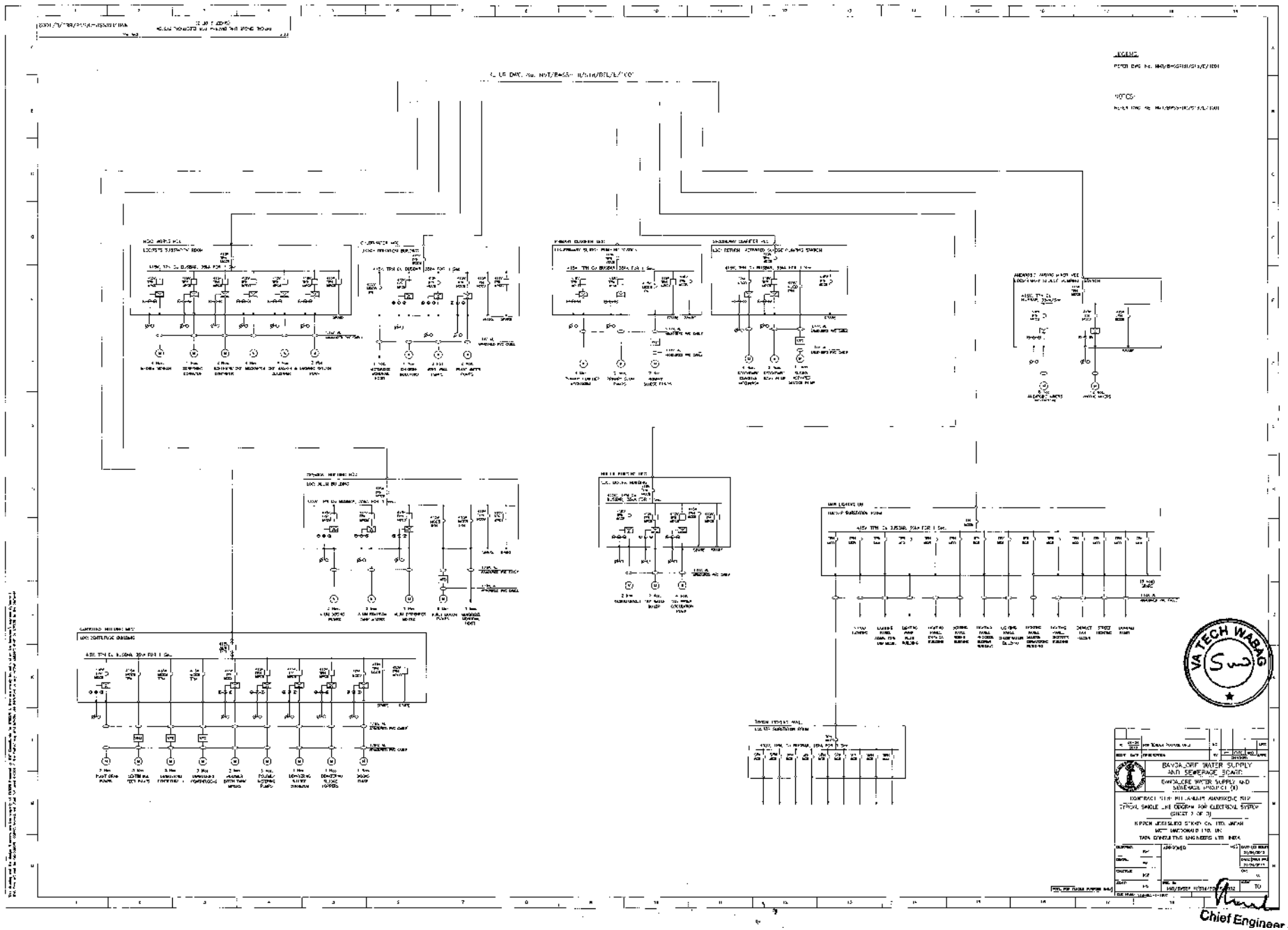
VA TECH WABAG

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (I)
CONTRACT S1&: HITTANDUR AMANIKERE STP
SCHEMATIC SYSTEM CONFIGURATION DIAGRAM
NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

Chief Engineer (K)

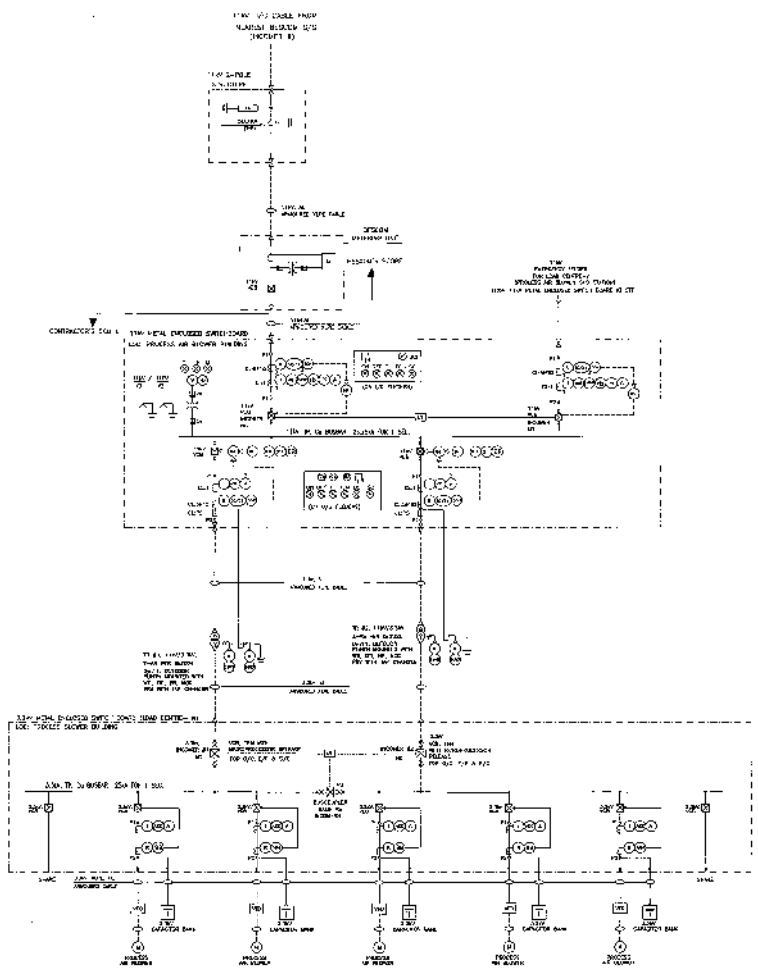


BANGALORE WATER SUPPLY AND SEWERAGE BOARD
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (W)
CONTRACT NO.W-161/ANNEXE-AWARENESS/ STP
TYPICAL SINGLE LINE DIAGRAM FOR ELECTRICAL SYSTEM (SHEET 1 OF 4)
NISHON ENGINEERING SERVICE CO. LTD. JAPAN
NOTT MACDONALD LTD UK
TATA CONSULTING ENGINEERS LTD. INDIA
APPROVED
DRG. NO. NAT/BWSSP-4/S-(x)/2[illegible]/001


LEGEND
BANGALORE WATER SUPPLY AND SEWERAGE BOARD
CONTRACT
TYPICAL SINGLE LINE DIAGRAM FOR ELECTRICAL SYSTEM
KIRLOSKAR BROTHERS LTD.
TATA CONSULTING ENGINEERS LTD
Chief Engineer

LEGEND:

NOTES.



VA TECH WABAG

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

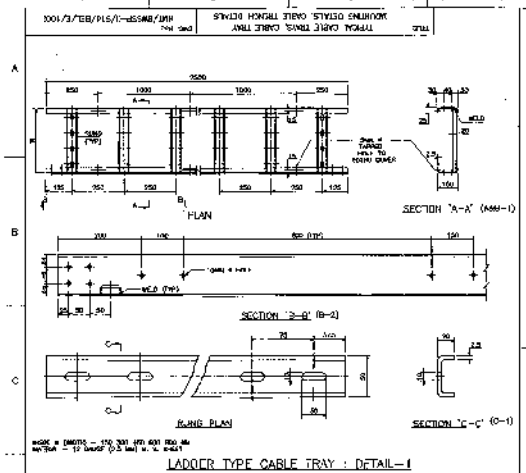
BANGALORE WATER SUPPLY AND SEWERAGE THRUUGH (K)

CONTRACT C10 BELLANDUR AMANIKERE STP

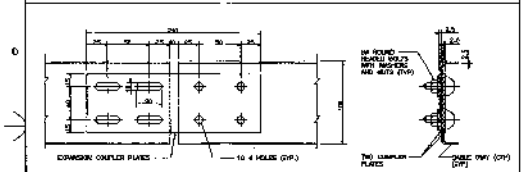
VALVE SHEET FOR DIAGRAM FOR ELECTRICAL SYSTEM (SHEET 3 OF 3)

M/S MUK ULDEUCHI SEIKO Co. LTD. JAPAN
M/S/ MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

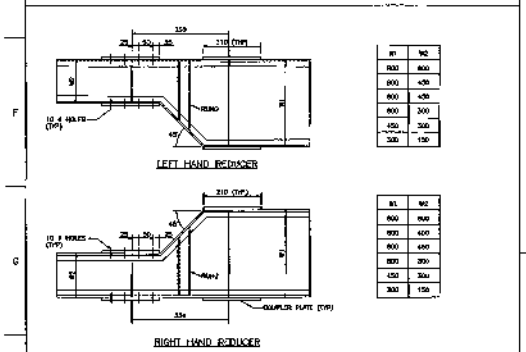
Chief Engineer (K)



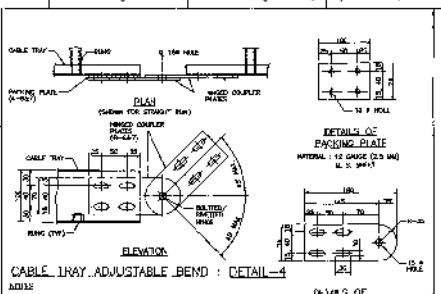
LADDER TYPE CABLE TRAY : DETAIL–1



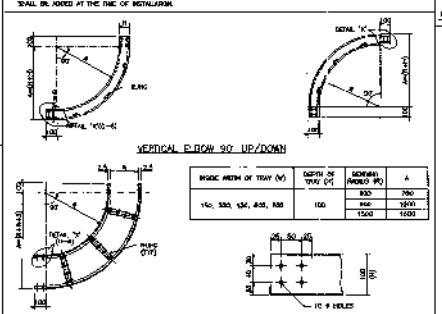
COUPLER PLATES FOR CABLE TRAY : DETAIL–2



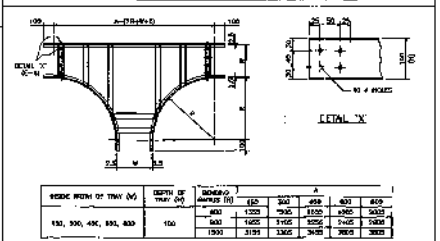
CABLE TRAY REDUCER : DETAIL–3



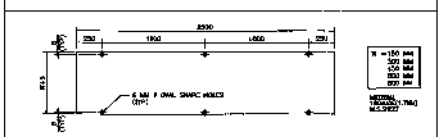
CABLE TRAY ADJUSTABLE BEND : DETAIL–4



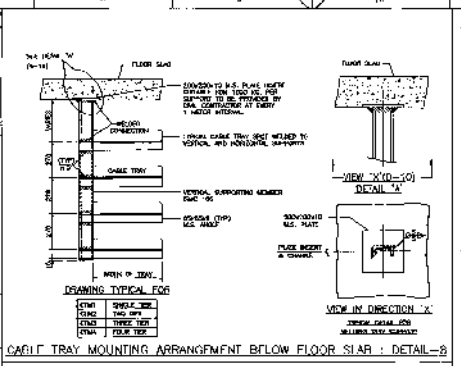
CABLE TRAY 90° BEND (CTB 90°) : DETAIL–5



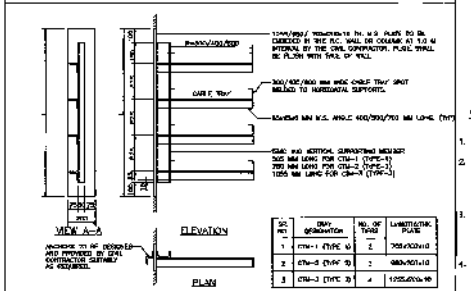
CABLE TRAY HORIZONTAL TEE : DETAIL–6



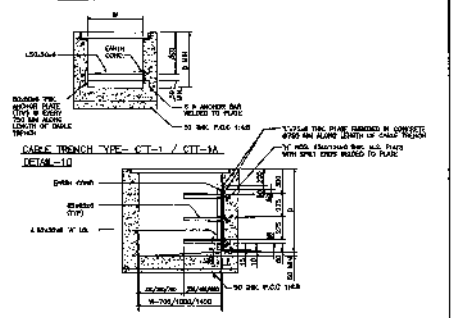
CABLE TRAY COVER (TYP) : DETAIL 7



CABLE TRAY MOUNTING ARRANGEMENT BELOW FLOOR SLAB : DETAIL–8



CABLE TRAY MOUNTING ON COLUMN/WALL : DETAIL–9



CABLE TRENCH TYPE– CTT–2, CTT–3, CTT–4 : DETAIL–11

NOTE: FOR TENDER PURPOSE ONLY

KEY PLAN

NIL

LEGEND

NIL

NOTES

1. ALL DIMENSIONS ARE IN MM.
2. CABLE TRAYS OF LADDER TYPE AND ASSOCIATED ACCESSORIES TEES, ELBOWS AND REDUCERS SHALL BE FABRICATED FROM 12 GAUGE (2.5 MM THK.) MILD STEEL PLATE COVER SHALL BE FABRICATED FROM 16 GAUGE (1.7 MM THK.) M.S. SHEET.
3. ALL CABLE TRAYS, SUPPORTING MATERIAL AND ACCESSORIES SHALL BE HOT DIP GALVANISED AFTER FABRICATION ACCORDING TO THE LATEST REVISION OF IS:2629, 2633 AND 4759. BOLTS, NUTS AND WASHERS SHALL BE ELECTRO GALVANISED.
4. THE STRUCTURAL STEEL (STANDARD QUALITY) SHALL BE ACCORDING TO LATEST REVISION OF IS:2062. ALL WELDING SHALL BE AS PER LATEST REVISION OF IS:816.

ENGINEERING REFERENCE DRAWINGS

NIL

CONSTRUCTION REFERENCE DRAWINGS

NIL

TD	01-04-2013	FOR TENDER PURPOSE ONLY	KB			MGS
ISSUE	DATE	DESCRIPTION	BY	PRI. CHKD	SEC. CHKD	APPD.

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)

CONTRACT S1d: BELLANDUR AMANIKERE STP

TYPICAL CABLE TRAYS, CABLE TRAY MOUNTING DETAILS, CABLE TRENCH DETAILS

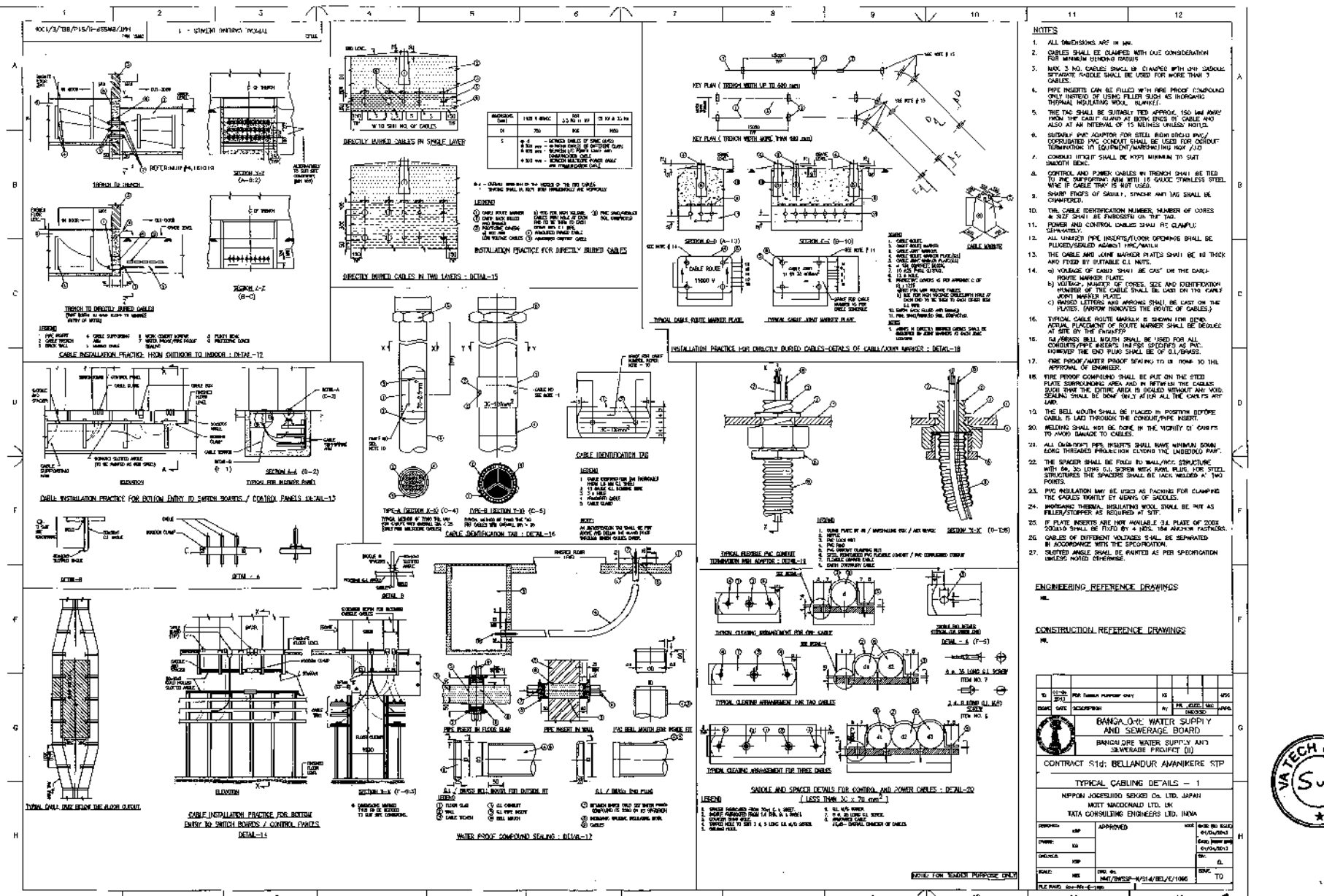
NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

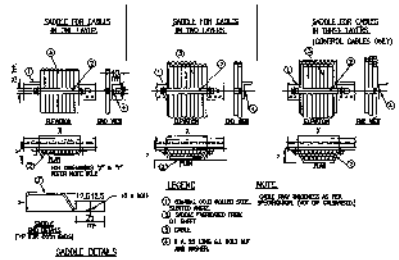
REFERENCE:		APPROVED	DATE: (NO ISSUE) 01/04/2013
DRAWN:	KB		DATE: (Latest issue) 01/04/2013
CHECKED:			DRG. NO.
SCALE:	NTS	DWG. no. AMT/BWSSP–II/S1d/BEL/E/1004	REVISE: TO

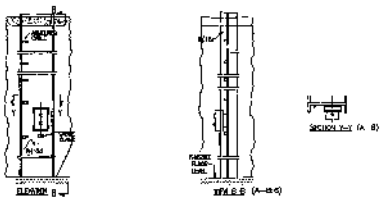
FILE NAME: S1d-BEL-E-1004

VA TECH WABAG

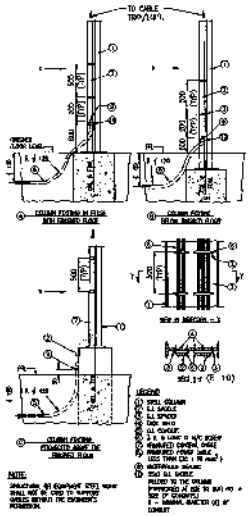
Chief Engineer (K)


NOTES
1. ALL DIMENSIONS ARE IN MM.
2. CABLES SHALL BE CLAMPED WITH DUE CONSIDERATION FOR MINIMUM BENDING RADIUS
3. MAX. 3 NO. CABLES SHALL BE CLAMPED WITH ONE SADDLE. SEPARATE SADDLE SHALL BE USED FOR MORE THAN 3 CABLES.
4. PIPE INSERTS CAN BE FILLED WITH FIRE PROOF COMPOUND ONLY INSTEAD OF USING FILLER SUCH AS INORGANIC THERMAL INSULATING WOOL, BLANKET.
5. THE TAG SHALL BE SUITABLY TIED APPROX. 150 MM AWAY FROM THE CABLE GLAND AT BOTH ENDS OF CABLE AND ALSO AT AN INTERVAL OF 15 METRES UNLESS NOTED.
6. SUITABLE PVC ADAPTOR FOR STEEL (GI/MS) CONDUIT PVC/ CORRUGATED PVC CONDUIT SHALL BE USED FOR OUTDOOR TERMINATION TO EQUIPMENT/MARSHALING BOX / J.B.
7. CONDUIT OFFSET SHALL BE KEPT MINIMUM TO SUIT SMOOTH BEND.
8. CONTROL AND POWER CABLES IN TRENCH SHALL BE TIED TO THE SUPPORTING ARM WITH 16 GAUGE STAINLESS STEEL WIRE IF CABLE TRAY IS NOT USED.
9. SHARP EDGES OF SADDLE, SPACER AND TAG SHALL BE CHAMFERED.
10. TAG, CABLE IDENTIFICATION NUMBER, NUMBER OF CORES & SIZE SHALL BE EMBOSSED ON THE TAG.
11. POWER AND CONTROL CABLES SHALL BE CLAMPED SEPARATELY.
12. ALL UNUSED PIPE INSERTS/FLOOR OPENINGS SHALL BE PLUGGED/SEALED AGAINST FIRE/WATER.
13. THE CABLE AND JOINT MARKER PLATES SHALL BE 3.0 THK AND FIXED BY SUITABLE G.I. NUTS.
14. a) VOLTAGE OF CABLE SHALL BE CAST ON THE CABLE ROUTE MARKER PLATE.
b) VOLTAGE, NUMBER OF CORES, SIZE AND IDENTIFICATION NUMBER OF THE CABLE SHALL BE CAST ON THE CABLE JOINT MARKER PLATES.
c) EMBOSSED LETTERS AND ARROWS SHALL BE CAST ON THE PLATES. (ARROW INDICATES THE ROUTE OF CABLES.)
16. TYPICAL CABLE ROUTE MARKER IS SHOWN FOR REFERENCE. ACTUAL PLACEMENT OF ROUTE MARKER SHALL BE DECIDED AT SITE BY THE ENGINEER.
18. GI/BRASS BELL MOUTH SHALL BE USED FOR ALL CONDUITS/PIPE ENTRIES UNLESS SPECIFIED AS PVC. HOWEVER THE END PLUG SHALL BE OF GI/BRASS.
17. FIRE PROOF/WATER PROOF SEALING TO BE DONE TO THE APPROVAL OF ENGINEER.
18. FIRE PROOF COMPOUND SHALL BE PUT ON THE STEEL PLATE SURROUNDING AREA AND IN BETWEEN THE CABLES SUCH THAT THE ENTIRE AREA IS SEALED WITHOUT ANY VOID. SEALING SHALL BE DONE ONLY AFTER ALL THE CABLES ARE LAID.
19. THE BELL MOUTH SHALL BE PLACED IN POSITION BEFORE CABLE IS LAID THROUGH THE CONDUIT/PIPE INSERT.
20. WELDING SHALL NOT BE DONE IN THE VICINITY OF CABLES TO AVOID DAMAGE TO CABLES.
21. ALL GALVANISED PIPE INSERTS SHALL HAVE MINIMUM SOCKET LONG THREADED PROJECTION EXCEPT THE EMBEDDED PART.
22. THE SPACER SHALL BE FIXED TO WALL/RCC STRUCTURE WITH 6Ø, 30 LONG G.I. SCREW WITH RAWL PLUG. FOR STEEL STRUCTURES THE SPACERS SHALL BE TACK WELDED AT TWO POINTS.
23. PVC INSULATION MAY BE USED AS PACKING FOR CLAMPING THE CABLES TIGHTLY BY MEANS OF SADDLES.
24. MONTMORIC THERMAL INSULATING WOOL SHALL BE PUT AS FILLER/STOPPER AS REQUIRED AT SITE.
25. IF PLATE INSERTS ARE NOT AVAILABLE 3.4 PLATE OF 200X200X10 SHALL BE FIXED BY 4 NOS. 16Ø ANCHOR FASTNERS.
26. CABLES OF DIFFERENT VOLTAGES SHALL BE SEPARATED IN ACCORDANCE WITH THE SPECIFICATION.
27. SLOTTED ANGLE SHALL BE PAINTED AS PER SPECIFICATION UNLESS NOTED OTHERWISE.
ENGINEERING REFERENCE DRAWINGS
NIL
CONSTRUCTION REFERENCE DRAWINGS
NIL
BANGALORE WATER SUPPLY AND SEWERAGE BOARD
BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)
CONTRACT S1d: BELLANDUR AVANIKERE STP
TYPICAL CABLING DETAILS – 1
NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA
APPROVED
NOTE FOR TENDER PURPOSE ONLY
Chief Engineer (K)
BWSSB

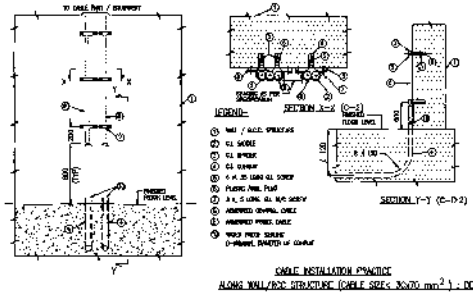

SADDLE FOR CABLES IN ONE LAYER
SADDLE FOR CABLES IN TWO LAYERS
SADDLE FOR CABLES IN THREE LAYERS (CONTROL CABLES ONLY)
LEGEND
NOTE
SADDLE DETAILS



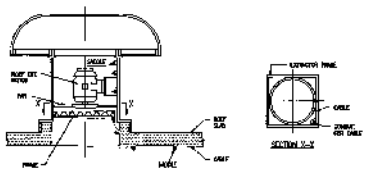
INSTALLATION OF PUSH BUTTON & CABLES : DETAIL-22



CABLE INSTALLATION PRACTICE
ALONG STEEL SUPPORT (CABLE SIZE < 30x70 mm^2)
DETAIL-24



CABLE INSTALLATION PRACTICE
ALONG WALL/RCC STRUCTURE (CABLE SIZE< 30x70 mm^2) : DETAIL-21



CABLE INSTALLATION PRACTICE TO ROOF EXTRUSIONS : DETAIL-23

NOTES

1. FOR OTHER NOTES REF. Drg.No. NWT/BWSSP-II/S14/BEL/E/1004
2. THE DIMENSIONS "X" AND "Y" SHALL BE DECIDED TO SUIT SITE CONDITIONS. HOWEVER "X" SHALL NOT EXCEED 250MM

ENGINEERING REFERENCE DRAWINGS

- NIL -

CONSTRUCTION REFERENCE DRAWINGS

- NIL -

NOTE: FOR TENDER PURPOSE ONLY

ISSUE	DATE	DESCRIPTION	BY	CHECKED
TD	07.04.2015	FOR TENDER PURPOSE ONLY	MS	MSB

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)

CONTRACT S1d: BELLANDUR AMANIKERE STP

TYPICAL CABLING DETAILS – 2

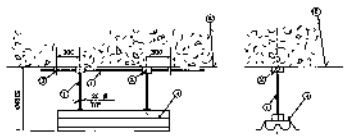
NIPPON JOGESUIDO SEKKEI Co. Ltd. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

		APPROVED	MDS	DATE
DESIGNED	KSR			
DRAWN	BC			
CHECKED	APDP			
SCALE	NTS	DWG. NO. NWT/BWSSP-II/S14/BEL/E/1008		TD

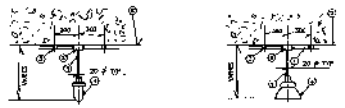
FILE NAME: S14-BEL-E-1008

VA TECH WABAG

Chief Engineer (K)



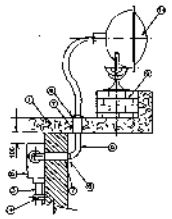
FLUORESCENT TUBE FIXTURE PENDENT MOUNTING
TYPE–A



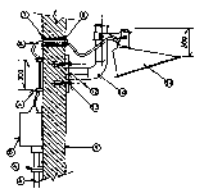
INCANDESCENT LAMP FIXTURE
TYPE–B

LEGEND:–
1. CONDUIT WITH WIRING / RIGID SUSPENSION.
2. CONDUIT JUNCTION BOX WITH BALL AND SOCKET SUSPENSION.
3. GALVANISED HANGER AND SPACER.
4. LIGHTING FITTING.
5. CEILING.

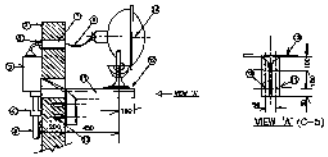
PENDENT/SUSPENSION MOUNTING



TYPE–C



TYPE–D

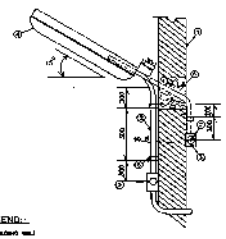


TYPE–E

VIEW 'A' (C–D)

WALL/ROOF MOUNTING OF FLOOD LIGHT

LEGEND:–
1. ROOF
2. WALL.
3. CLEARANCE.
4. CLAMPBOLT AND STANDOFF.
5. CONTROL GEAR BOX.
6. 25 ø GI FLEXIBLE CONDUIT.
7. 50 ø GI SLEEVE EMBEDDED IN WALL/ROOF.
8. WATERPROOF SEALING.
9. SUITABLE SIZED WASHERS BLACK.
10. BRACKET FABRICATED FROM SUITABLE G.I. CHANNEL
11. BRACKET FABRICATED FROM 150 x 50 x 6(GA)
12. 250 x 250 x 6 G.I.PLATE WELDED TO BRACKET.
13. M5 ø GI. BOLTS / WASHER FASTENERS.
14. LIGHTING FITTING



SWAN NECK MOUNTING
TYPE F1

LEGEND:–
1. BUILDING WALL
2. CONDUIT FOR SUSPENDING LIGHTING FITTING / WIRING.
3. CONDUIT JUNCTION BOX.
4. LIGHTING FITTING.
5. 150X150 CEMENT MORTOR (1:2) SPOUT
6. GI. BACKLE AND STANDER.

NOTES

1. ALL DIMENSIONS ARE IN MM.
2. ALL EQUIPMENT AND INSTALLATION SHALL COMPLY WITH RELEVANT INDIAN ELECTRICITY RULES, INDIAN STANDARDS AND CODES OF PRACTICE, FIRE INSURANCE REGULATIONS AND OTHER APPLICABLE CODES & REGULATIONS.
3. LIGHTING LAYOUT SHALL BE COORDINATED WITH CABLING AND STRUCTURAL WORK OF OTHER CONTRACTORS. IF NECESSARY MODIFICATIONS TO LIGHTING LAYOUT SHALL BE CARRIED OUT AT SITE AS REQUIRED BY ENGINEER'S REPRESENTATIVE.
4. UNLESS NOTED OTHERWISE, LIGHTING PANELS, LIGHT CONTROL SWITCHES, RECEPTACLES SHALL BE INSTALLED AT THE FOLLOWING MOUNTING HEIGHT FROM FINISHED FLOOR/GROUND LEVEL
   a) LIGHTING PANEL : +1200 MMTO BOTTOM OF THE PANEL
   b) LIGHTING CONTROL SWITCHES :+1200MM
   c) RECEPTACLES WITH SWITCHES:500 MM, (NOMIN) 6(100) MM FOR OUTDOOR
5. ALL LIGHTING CIRCUIT WIRING SHALL BE CARRIED OUT WITH (ONE CORE 1.5 SQMM, 650/1100V GRADE COPPER CONDUCTOR, STRANDED PVC INSULATED WIRES AND PASS IN 20 MM DIA G.I. CONDUIT UNLESS NOTED OTHERWISE.
6. ALL SINGLE PHASE 3 PIN RECEPTACLE CIRCUIT WIRING SHALL BE CARRIED OUT WITH ONE CORE 2.5 SQMM COPPER CONDUCTOR, PVC INSULATED WIRES AND PASS IN 25 MM DIA G.I. CONDUIT UNLESS NOTED OTHERWISE.
7. WIRING FOR NORMAL & EMERGENCY LIGHTING CIRCUITS SHALL BE RUN IN SEPARATE CONDUITS WIRING FOR EMERGENCY FITTINGS & RECEPTACLES SHALL BE RUN IN SEPARATE CONDUITS.
8. LIGHTING CIRCUITS SHALL BE COLOUR CODED AS FOLLOWS

NORMAL AC/DC	PHASE (ANY ONE)	RED YELLOW OR BLUE TO BE SELECTED BY THE CONTRACTOR
	SWITCH	YELLOW WHEN THE GROUP IS SUPPLIED
	PHASE FROM SAME PHASE	
	NEUTRAL	BLACK
	EARTH	GREEN
EMERGENCY CIRCUITS	PHASE	GREY
	NEUTRAL	BLACK

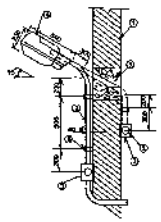
9. WIRES FROM DIFFERENT PHASES SHALL NOT BE RUN IN THE SAME CONDUIT.
10. OUTDOOR LIGHTING INSTALLATION SHALL BE CARRIED OUT USING 1100V GRADE 4 CORE, ALUMINIUM CONDUCTOR, PVC INSULATED PVC SHEATHED GALVANISED STEEL WIRE ARMOURED (ARMOURED SIZE OF COMBINATION FOR OUTDOOR WIRING SHALL BE A MINIMUM ARMOURED DEPTH OF LAYING FOR CABLES BURIED IN GROUND WHERE, AS SPECIFIED.
11. RYB & NEUTRAL RECEPTACLES SHALL BE WIRED BY 4 CORE ARMORED 2 SQ. ALUMINIUM CONDUCTOR PVC SHEATHED, ARMOURED, 650/1100V GRADE CABLE.
12. ALL JUNCTION BOXES SHALL BE OF GALVANISED CAST IRON BOXES FOR MOUNTING SWITCHES & RECEPTACLES SHALL BE MADE UP OF 18 SWG SHEET STEEL & PAINTED.
13. LIGHTING FIXTURES, PATTRESSELS BOXES, SWITCH BOXES, JUNCTION BOXES ETC. SHALL BE PROPERLY EARTHED USING 12 SWG G.I. WIRE. GALVANISED STEEL CONDUITS SHALL BE BONDED ACROSS CONDUIT DISCONTINUITY FITTINGS WITH 10SWG CLIMPS & CLEATED AT LIGHTING DISTRIBUTION BOARDS , JUNCTION BOXES OF STREET LIGHTING POLES SHALL BE EARTHED USING 8 SWG. G.I. WIRE.
14. UNDERGROUND PVC CABLE JOINTS WILL NOT BE PERMITTED PVC CABLES SHALL BE LAYED IN AND OUT IN THE JUNCTION BOXES MOUNTED ON LIGHTING FIXTURE POLE.
15. AT ALL ROAD CROSSINGS UNDERGROUND CABLE SHALL BE RUN IN HUME PIPES BURIED AT A DEPTH OF 1000 MM BELOW ROAD LEVEL.

ENGINEERING REFERENCE DRAWINGS

– nil –

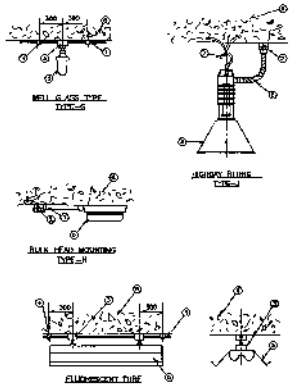
CONSTRUCTION REFERENCE DRAWINGS

– nil –



STREET LIGHT WALL MOUNTING
TYPE F–2

LEGEND:–
1. BUILDING WALL
2. CONDUIT FOR SUPPORTING LIGHTING FITTING / WIRING.
3. CONDUIT JUNCTION BOX.
4. LIGHTING FITTING.
5. 150X150 CEMENT MORTOR (1:2) SPOUT.
6. GI. BACKLE AND STANDER.



WELL GLASS TYPE
TYPE–G

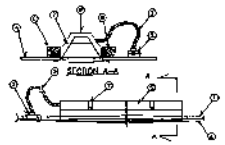
HIGHWAY BULKHEAD
TYPE–J

BULK HEAD MOUNTING
TYPE–H

FLUORESCENT TUBE
TYPE–K

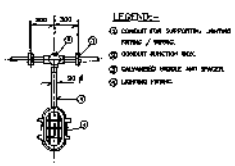
CEILING MOUNTING

LEGEND:–
1. CONDUIT FOR WIRING
2. JUNCTION JUNCTION BOX
3. CONDUIT JUNCTION BOX WITH BALL AND SOCKET SUSPENSION.
4. ALL SCREW & NAIL SPACER.
5. LIGHTING FITTING.
6. 25 ø GI. FLEXIBLE CONDUIT.
7. HOOK FOR SUSPENSION OF LIGHTING FITTING
8. CEILING.



RECESSED MOUNTING
TYPE–L

LEGEND:–
1. CONDUIT FOR WIRING/SUPPORTING LIGHTING FITTING
2. CONDUIT JUNCTION BOX.
3. 25 ø GI FLEXIBLE CONDUIT AS PER RELEVANT INDIAN STANDARD UNLESS OTHERWISE SPECIFIED.
4. PLAIN GI PIPE.
5. LIGHTING FITTING (2 X 40 W UNLESS NOTED).
6. WOODEN BLOCK.
7. 38 X 4 G.I. CLAMP FIXED TO TIMBER BLOCK.
8. 4 ø GI SCREWS.
9. 6 ø GI BOLTS With hexG NUTS.



WALL MOUNTING
TYPE–M

LEGEND:–
1. CONDUIT FOR SUPPORTING LIGHTING FITTING / WIRING.
2. CONDUIT JUNCTION BOX.
3. GALVANISED HANGER AND SPACER.
4. LIGHTING FITTING.

NOTE: FOR TENDER PURPOSE ONLY

TO	01-04-2013	FOR TENDER PURPOSE ONLY	NS	MDA
ISSUE	DATE	DESCRIPTION	BY	APPD

PR. PROJECT MNG. CHECKED

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)

CONTRACT S1d: BELLANDUR AMANIKERE STP

TYPICAL LIGHTING FIXTURE SUPPORTING DETAILS – 1

NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

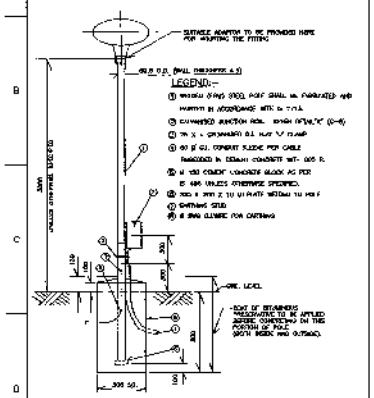
PLANNED:	KSP	APPROVED	DATE: 04/04/2013
DRAWN:	PC		DATE: 01/04/2013
CHECKED:	KSP		DRG. NO. 01
SIGNED:	MDS	DRG. No. P:\PMT\BWSSP-II\S1d\DRG\PC\10017	ISSUE TO

FILE NAME: S1d-DRG-C-1017

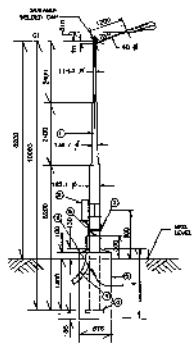
VA TECH WABAG

Chief Engineer (K)

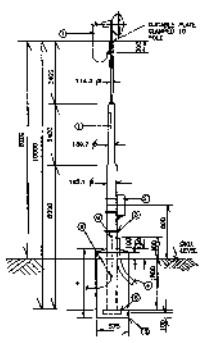
1336



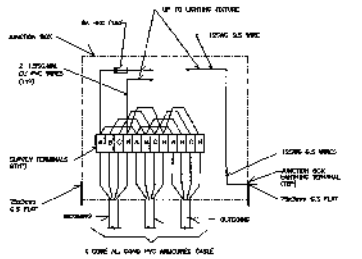
POST TOP LANTERN POLE MOUNTING
TYPE-N



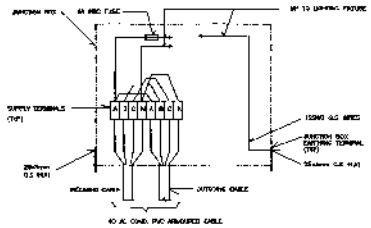
STREET LIGHT
POLE MOUNTING
TYPE-P



FLOOD LIGHT
POLE MOUNTING
TYPE-R



3WAY JUNCTION BOX
SCHEMATIC ARRANGEMENT
DETAIL-Y



2WAY JUNCTION BOX
SCHEMATIC ARRANGEMENT
DETAIL-Z

NOTE

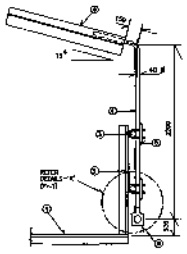
1 FOR GENERAL NOTES REFER DRGN. .....

ENGINEERING REFERENCE DRAWING

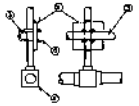
– nil –

CONSTRUCTION REFERENCE DRAWINGS

– NIL –

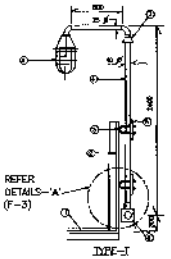


TYPE-S



ELEVATION SIDE VIEW

DETAIL-'A'



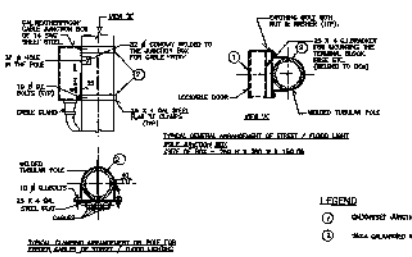
REFER DETAILS-'A' (F-3)

TYPE-T

LEGEND:-

1. WALL-MAY
2. POLE-DAL STRUCTURE
3. POLE-DAL (TYP.) ALONG THE TRACK WAY.
4. CONDUIT FOR SUPPORTING LIGHTING FITTING.
5. GALVANISED G.I. PLATE (150MMX150MM) WELDED TO STRUCTURE.
6. 8 nos G.I. U BOLT.
7. SOCKET.
8. CONDUIT JUNCTION BOX.
9. LIGHTING FITTING.

HAND RAIL MOUNTING



TYPICAL GENERAL ARRANGEMENT OF STREET / FLOOD LIGHT POLE JUNCTION BOX FOR 36m W x 36m W x 150.0m

TYPICAL FIXING ARRANGEMENT ON POLE FOR FIXING CABLES OF STREET / FLOOD LIGHTING

STREET/FLOOD LIGHT POLE JUNCTION BOX
DETAIL-X

LEGEND

7. GALVANISED JUNCTION BOX
8. 50x6 GALVANISED M.S. FLAT 'U' CLAMP

10	01-04-2013	FOR TENDER PURPOSE ONLY	KD				MSS
Issued	Date	DESCRIPTION	BY	PPL	M&E	S&C	APPD.
					CHECKED		

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)

CONTRACT 51d: BELLANDUR AMANIKERE STP

TYPICAL LIGHTING FIXTURE SUPPORTING DETAILS - 2

NIPPON JOGESUIDO SEKKEI Co. LTD JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD INDIA

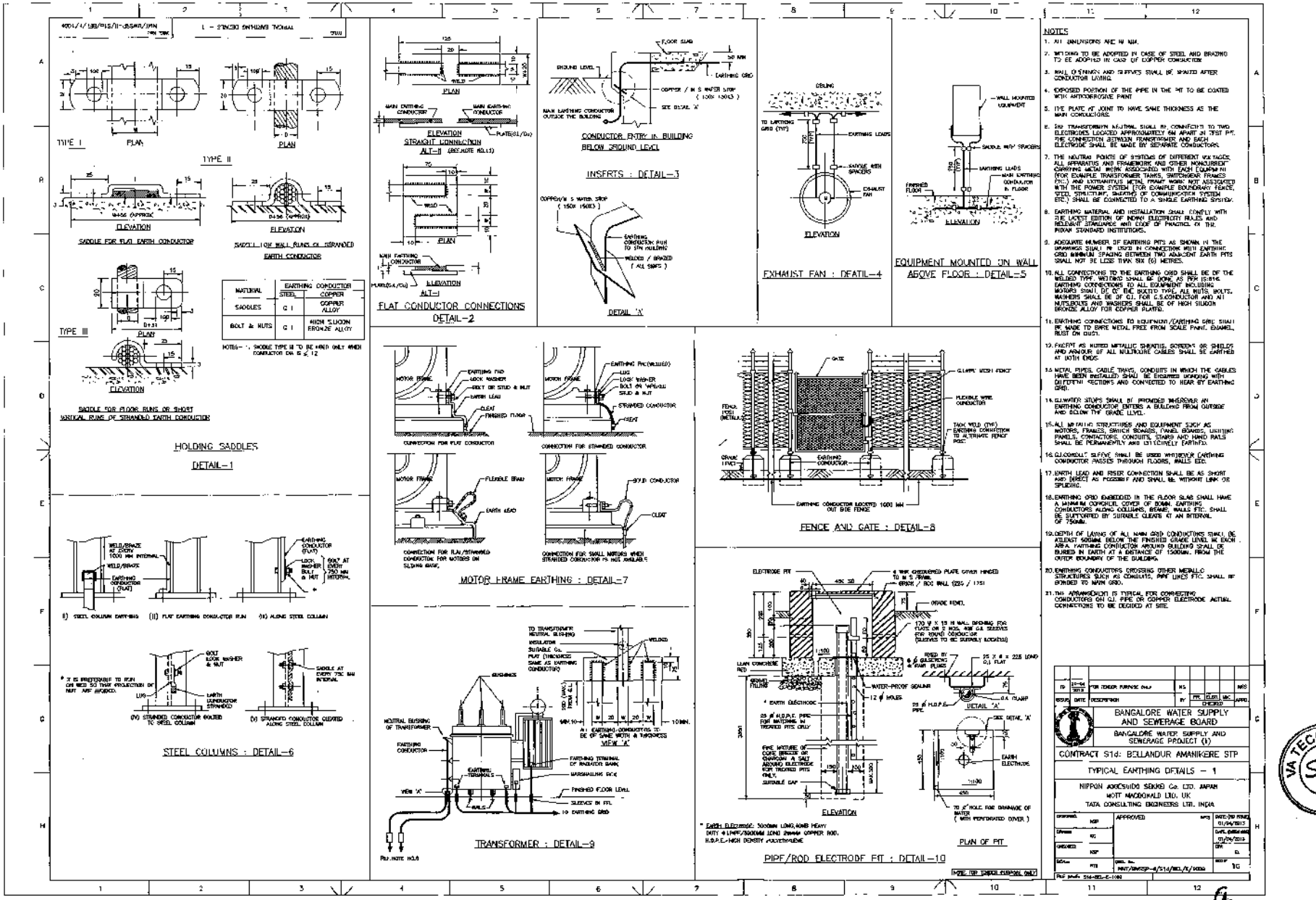
DESIGNED:	KSP	APPROVED	MSS DATE: DD MM YY 01/04/2013
DRAWN:	KC		DATE: DD MM YY 01/04/2013
CHECKED:	KSP		DR.
BOARD	MSS	DRG. No. /WAT/BWSSP-II/STD/ELEC/E/1008	ISSUE TO

FILE NAME: STD-ELEC-E-1008

NOTE: PART BWSSB REFERENCE DATA

VA TECH WABAG

Chief Engineer (K)
BWSSB



NOTES

1. ALL DIMENSIONS ARE IN MM.
2. WELDING TO BE ADOPTED IN CASE OF STEEL AND BRAZING TO BE ADOPTED IN CASE OF COPPER CONDUCTOR
3. WALL OPENINGS AND SLEEVES SHALL BE MADED AFTER CONDUCTOR LAYING.
4. EXPOSED PORTION OF THE PIPE IN THE PIT TO BE COATED WITH ANTICORROSIVE PAINT
5. I'VE PLATE AT JOINT TO HAVE SAME THICKNESS AS THE MAIN CONDUCTORS.
6. STAR TRANSFORMER NEUTRAL SHALL BE CONNECTED TO TWO ELECTRODES LOCATED APPROXIMATELY 6M APART IN TEST PIT. THE CONNECTION BETWEEN TRANSFORMER AND EACH ELECTRODE SHALL BE MADE BY SEPARATE CONDUCTORS.
7. THE NEUTRAL POINTS OF SYSTEMS OF DIFFERENT VOLTAGES, ALL APPARATUS AND FRAMEWORK AND OTHER NONCURRENT CARRYING METAL WORK ASSOCIATED WITH EACH EQUIPMENT (FOR EXAMPLE TRANSFORMER TANKS, SWITCHGEAR FRAMES ETC.) AND EXTRANEOUS METAL PLANT WORK NOT ASSOCIATED WITH THE POWER SYSTEM (FOR EXAMPLE BOUNDARY FENCE, STEEL STRUCTURE, SHEATHS OF COMMUNICATION SYSTEM ETC.) SHALL BE CONNECTED TO A SINGLE EARTHING SYSTEM.
8. EARTHING MATERIAL AND INSTALLATION SHALL COMPLY WITH THE LATEST EDITION OF INDIAN ELECTRICITY RULES AND RELEVANT STANDARDS AND CODE OF PRACTICE OF THE INDIAN STANDARD INSTITUTIONS.
9. ADEQUATE NUMBER OF EARTHING PITS AS SHOWN IN THE DRAWINGS SHALL BE USED IN CONNECTION WITH EARTHING GRID MINIMUM SPACING BETWEEN TWO ADJACENT EARTH PITS SHALL NOT BE LESS THAN SIX (6) METRES.
10. ALL CONNECTIONS TO THE EARTHING GRID SHALL BE OF THE WELDED TYPE. WELDING SHALL BE DONE AS PER IS:816. EARTHING CONNECTIONS TO ALL EQUIPMENT INCLUDING MOTORS SHALL BE OF THE BOLTED TYPE. ALL NUTS, BOLTS, WASHERS SHALL BE OF G.I. FOR C.S.CONDUCTOR AND ALL NUTS,BOLTS AND WASHERS SHALL BE OF HIGH SILICON BRONZE ALLOY FOR COPPER PLATES.
11. EARTHING CONNECTIONS TO EQUIPMENT/EARTHING GRID SHALL BE MADE TO BARE METAL FREE FROM SCALE PAINT, ENAMEL, RUST OR DUST.
12. EXCEPT AS NOTED METALLIC SHEATHS, SCREENS OR SHIELDS AND ARMOUR OF ALL MULTICORE CABLES SHALL BE EARTHED AT BOTH ENDS.
13. METAL PIPES, CABLE TRAYS, CONDUITS IN WHICH THE CABLES HAVE BEEN INSTALLED SHALL BE ENSURED BONDING WITH DISTINCT SECTIONS AND CONNECTED TO NEAR BY EARTHING GRID.
14. G.I.WATER STOPS SHALL BE PROVIDED WHEREVER AN EARTHING CONDUCTOR ENTERS A BUILDING FROM OUTSIDE AND BELOW THE GRADE LEVEL.
15. ALL METALLIC STRUCTURES AND EQUIPMENT SUCH AS MOTORS, FRAMES, SWITCH BOARDS, PANEL BOARDS, LIGHTING PANELS, CONTACTORS, CONDUITS, STAIRS AND HAND RAILS SHALL BE PERMANENTLY AND EFFECTIVELY EARTHED.
16. G.I./CONDUIT SLEEVE SHALL BE USED WHEREVER EARTHING CONDUCTOR PASSES THROUGH FLOORS, WALLS ETC.
17. EARTH LEAD AND RISER CONNECTION SHALL BE AS SHORT AND DIRECT AS POSSIBLE AND SHALL BE WITHOUT LINK OR SPLICING.
18. EARTHING GRID EMBEDDED IN THE FLOOR SLAB SHALL HAVE A MINIMUM CONCRETE COVER OF 50MM. EARTHING CONDUCTORS ALONG COLUMNS, BEAMS, WALLS ETC. SHALL BE SUITABLY BY SUITABLE CLEATS AT AN INTERVAL OF 750MM.
19. DEPTH OF LAYING OF ALL MAIN GRID CONDUCTORS SHALL BE ATLEAST 500MM BELOW THE FINISHED GRADE LEVEL IN EACH AREA. EARTHING CONDUCTOR AROUND BUILDING SHALL BE BURIED IN EARTH AT A DISTANCE OF 1500MM. FROM THE OUTER BOUNDARY OF THE BUILDING.
20. EARTHING CONDUCTORS CROSSING OTHER METALLIC STRUCTURES SUCH AS CONDUITS, PIPE LINES ETC. SHALL BE BONDED TO MAIN GRID.
21. THIS ARRANGEMENT IS TYPICAL FOR CONNECTING CONDUCTORS ON G.I. PIPE OR COPPER ELECTRODE ACTUAL CONNECTIONS TO BE DECIDED AT SITE.

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
1D	25-04-2019	FOR TENDER PURPOSE ONLY	MS	PPC PLMS MC	MRS

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (I)

CONTRACT S1d: BELLANDUR AMANIKERE STP

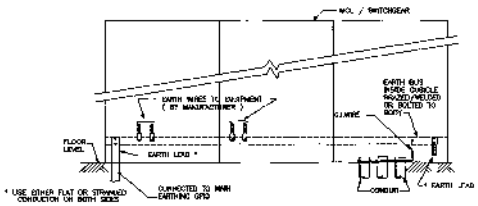
TYPICAL EARTHING DETAILS - 1

NIPPON KOEI/SUIDO SEIKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

		APPROVED	DATE
DESIGNED	NSP		01/04/2015
DRAWN	MS		01/04/2019
CHECKED	NSP		
SCALE	NTS	DWG. No.	REV.

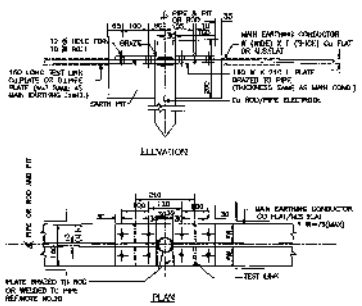
VA TECH WABAG

Chief Engineer (K)


MCC / SWITCHGEAR
EARTH WIRES TO EQUIPMENT (BY MANUFACTURER)
EARTH BUS BARS SUITABLE DRILLED AND BOLTED TO BOTH
FLOOR LEVEL
EARTH LEAD *
G.I.WIRE
CONDUIT
* EARTH LEAD
* USE EITHER FLAT OR STRANDED CONDUCTOR OF BOTH SIDES
CONNECTED TO MAIN EARTHING GRID

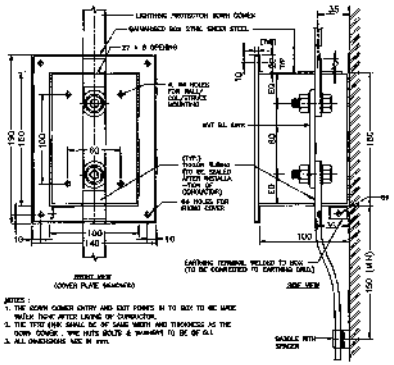
SWITCHGEAR

DETAIL-11

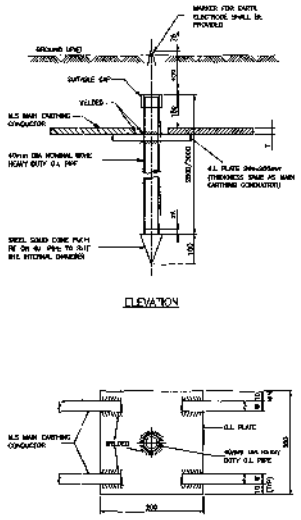


ELECTRODE CONNECTION DETAILS

DETAIL-12


LIGHTNING PROTECTION DOWN COMER
GALVANISED SIDE STRIP SHEET STEEL
FRONT VIEW
(COVER PLATE REMOVED)
SIDE VIEW
EARTHING TERMINAL WELDED TO ROD (TO BE CONNECTED TO EARTHING GRID)
SADDLE WITH SPACER
NOTES :
1. THE DOWN COMER ENTRY AND EXIT POINTS IN TO BOX TO BE MADE WATER TIGHT AFTER LAYING OF CONDUCTOR.
2. THE TEST LINK SHALL BE OF SAME WIDTH AND THICKNESS AS THE DOWN CONDR. THE NUTS BOLTS & washers TO BE OF G.I.
3. ALL DIMENSIONS ARE IN mm.

TEST LINK FOR LIGHNING PROTECTION DOWN COMER : DETAIL-13


MARKER FOR EARTH ELECTRODE SHALL BE PROVIDED
GROUND LEVEL
SUITABLE CAP
WELDED
M.S MAIN EARTHING CONDUCTOR
40mm DIA NOMINAL BORE HEAVY DUTY G.I. PIPE
G.I. PLATE 300x300mm (THICKNESS SAME AS MAIN EARTHING CONDUCTOR)
STEEL SOLID CORE PUCH 20 Dia 40 Nos TO SUIT BIS RATIONAL DIMENSIONS
ELEVATION
PLAN
G.I. PLATE
HEAVY DUTY G.I. PIPE

DIRECTLY BURIED G.I. PIPE ELECTRODE : DETAIL-14

NOTES:

1. FOR GENERAL NOTES REFER DRG. No. BWT/BWSSP -I/S1d/BCL/E/1009

ENGINEERING REFERENCE DRAWING:

- NIL -

CONSTRUCTION REFERENCE DRAWING:

NIL -

NOTE FOR TENDER PURPOSE ONLY

01-04-2013	FOR TENDER PURPOSE ONLY	RD			MSS
ISSUE	DATE	DESCRIPTION	BY	PRN.	INITIALS DATE CHECKED APPD.

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

BANGALORE WATER SUPPLY AND SEWERAGE PROJECT (II)

CONTRACT S1d: BELLANDUR AMANIKERE STP

TYPICAL EARTHING DETAILS-2

NIPPON JOGESUIDO SEKKEI Co. LTD. JAPAN
MOTT MACDONALD LTD. UK
TATA CONSULTING ENGINEERS LTD. INDIA

DESIGNED:	RSK	APPROVED	MSS
DRAWN:	MC		
CHECKED:	MM		
DATE:	MM	DRG. No. BWT/BWSSP-II/S1d/BCL/E/1011	REV. TO

FILE NAME: S1d-BCL-E-0019

VA TECH WABAG

Chief Engineer (K)
BWSSB